NOTICE

All drawings located at the end of the document.

RECONNAISSANCE-LEVEL CHARACTERIZATION REPORT FOR TRAILER 112B (T112B) (Survey Unit 112B)

Revision 0

April 3, 2000

This report has been reviewed and approved by:

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DOE, EMCBC
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ABBREVIATIONS/ACRONYMS

ACM	Asbestos containing material
ASD	Analytical Services Division
Be	Beryllium
CBDPP	Chronic Beryllium Disease Prevention Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CDPHE	Colorado Department of Public Health and the Environment
$DCGL_{EMC}$	Derived Concentration Guideline Level – elevated measurement comparison
$DCGL_W$	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DOT	Department of Transportation
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
FDPM	Facility Disposition Program Manual
HVAC	Heating, ventilation, air conditioning
IHSS	Individual Hazardous Substance Site
K-H	Kaiser-Hill
LBP	Lead-based paint
LCS	Laboratory control samples
LLW	Low-level waste
LSDW	Life safety disaster warning
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum detectable activity
MDC	Minimum detectable concentration
NORM	Naturally occurring radioactive material
NRA	Non-Rad-Added Verification
OSHA	Occupational Safety and Health Administration
PAC	Potential area of concern
PARCC	Precision, accuracy, representativeness, comparability and completeness
PCBs	Polychlorinated biphenyls
PLM	Polarized Light Microscopy
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TRU	Transuranic
TSA	Total surface activity
VOCs	Volatile organic compounds

EXECUTIVE SUMMARY

A Reconnaissance Level Characterization (RLC) was performed to dispose of Trailer 112B as waste. This RLC Report (RLCR) encompasses both radiological and chemical characterization. Because the trailer is classified as a MARSSIM Class 3 (RFCA/DPP Type 1) facility, the RLC also implemented a Pre-Demolition (final status) survey design to determine whether the trailer was eligible for free release. Physical, chemical and radiological hazards were assessed based on historical reviews, process knowledge, and newly acquired RLC data.

Results indicate no radioactive or chemical contamination exists and no significant physical hazards. Trailer 112B contains asbestos as part of the floor tile, but it is not friable and is considered an integral part of the structure. Based on the assessment, the trailer is confirmed to be a Type I facility and can be disposed of as sanitary waste.

A substantial number of radiochemical samples were acquired from the trailer roof as a result of elevated field survey results and an initial set of laboratory results (2 samples) that were indeterminate. A second sampling evolution of 19 radiochemistry samples provided conclusive proof that 1) there is no DOE-added contamination on the trailer roof, and 2) Po-210, a form of naturally occurring radioactive material, was the cause of elevated survey measurements (specifically alpha total surface activity) in the field.

1.0 INTRODUCTION

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous buildings and structures will be removed. Among these is Trailer T112B, which is currently located in the Property Use and Disposition (PU&D) Yard near Building 280. This trailer no longer supports the RFETS mission, and needs to be removed to reduce Site infrastructure, risks and operating costs.

Before the trailer can be released, hazards must first be identified. Hazards identified will be used to plan final disposition. This document presents the existing physical, radiological and chemical hazards associated with the trailer, and classifies the trailer pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a; Type 1, 2, or 3). The hazards assessment is based on facility history, process knowledge, operating and spill records, historical radiological and chemical data, and results of the RLC conducted. The RLC was conducted pursuant to the RFETS Decontamination and Decommissioning Characterization Protocol (DDCP). The content and outline of this report are consistent with the Kaiser-Hill (K-H) Facility Disposition Program Manual (FDPM, K-H, 1998b).

1.1 Purpose

The purpose of this report is to communicate and document the results of the RLC effort, which consisted of:

- definition of individual hazards and overall risk associated with facility decontamination and decommissioning (D&D);
- typing of the trailer based on the hazards identified; and
- determination of the waste type.

This report summarizes the data into a concise, usable format and interprets the data for use in management decisions.

1.2 Scope

This report covers physical, radiological and chemical characterization of T112B. Chemical characterization was conducted using Colorado Hazardous Waste Management regulations as a means to segregate materials as either hazardous or non-hazardous waste. Radiologically, the trailer was typed and assessed against free-release criteria.

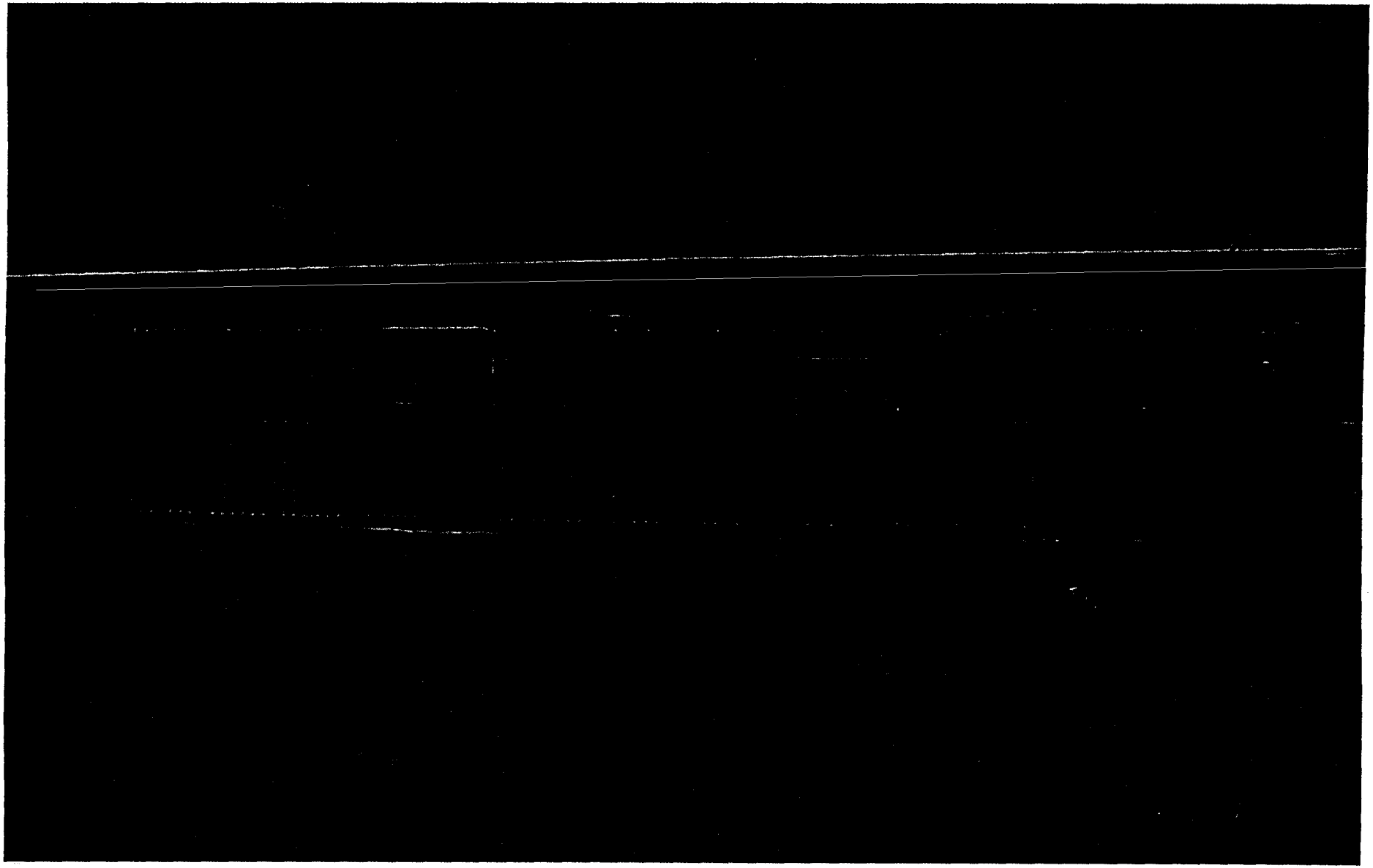
2.0 OPERATING HISTORY AND PHYSICAL DESCRIPTION

This trailer is currently located in the B280 Yard awaiting disposal (Exhibit 2-1). It was purchased in 1984 as a laundry support trailer for the B778 laundry, where it resided on the hill immediately west of the road that winds around B776. This site is the location of IHSS 150.2. It was in use at that location until Building 556 was built. It was then moved in the 1990/'91 timeframe northwest of B112 at which time the interior was refurbished. The ceiling consists of plastic panels that go the full width of the trailer and are two feet wide. There are two doors on one side, which had a wooden deck that ran the full length of the trailer. The deck was covered three quarters of its length and had a sloped, uncovered truck dock at the one end. Midway there were wooden steps leading to the deck. On the other end there was a set of steps and a wooden ramp. The siding and the skirting around the bottom of the trailer are enamel baked on aluminum. The interior outside walls consist of wood paneling over insulation; the interior partition wall is wood paneling on stud framing, and the floor is carpet over tile on wood. There are two rooms and a coat closet in this trailer. The trailer was set up for electric baseboard heating and had three window air conditioners.

When the trailer was near B778, it was used to fold various pieces of laundry. In 1992 Telecommunications used it for office space. It was used for offices until 1998, when it was converted to a storage facility for telecommunication equipment. No chemicals were used or stored in the trailer, nor is there any history of waste processing in or adjacent to the trailer. No equipment remains in the trailer.

Trailer T112B is listed in I-P73-HSP-18.10, *Radioactive Material Transfer And Unrestricted Release Of Property And Waste, Appendix 4, Unrestricted Release Building/Facility List.* This listing authorizes the unrestricted release of administrative, non-hazardous property located in the trailers without radiological surveys or Radiological Safety signature for off-site shipment or transfer to PU&D, and is indicative of structures with a low probability of radioactive contamination. These assumptions do not directly apply to the trailer, but does illustrate an area with a very low probability for radioactive contamination.

Exhibit 2-1 Exterior Photograph of T112B



3.0 SUMMARY OF CHARACTERIZATION ACTIVITIES

This section of the RLC Report (RLCR) presents the data quality objectives (DQOs) used, historical data, and additional RLC data collected to release the trailer. The section also describes the trailer as a radiological survey unit (112B), and defines the measurement methods that were implemented. The radiological survey followed the guidance provided in NUREG-1575, the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) for radiological free-release purposes.

3.1 Data Quality Objectives

The following section outlines the DQO process used in designing the RLC Package.

The Problem

The problem consisted of the unknown nature and extent of radiological and chemical contamination on and in the trailer.

The Decision

Does the trailer, interior and exterior, meet free-release criteria relative to radiological and chemical constituents? Stated differently, is there any radiological or chemical contamination in or on the trailer?

Inputs to the Decision

The inputs to the decision include information from interviews, RLC data, radiological free-release criteria, and waste acceptance criteria.

Decision Boundaries

The decision boundaries include the interior and exterior of T112B.

Decision Rules

This section presents the rules to support the characterization decisions. The rules cover T112B-specific potential contaminants of concern. Rules are not included for contaminants that are known not to be present on or in T112B (i.e., Beryllium, hazardous substances, or hazardous waste).

Radionuclides

If radiological results due to DOE-added material are below the surface contamination guidelines provided in DOE Order 5400.5 (Radiation Protection of the Public and Environment), the related surface is not considered radiologically contaminated. Otherwise, the unit is considered radiologically contaminated and must be reclassified (as a Type 2 or 3).

Polychlorinated Biphenyls (PCBs)

If PCB contamination from a past spill/release is suspected, or if a PCB spill is discovered that has not been cleaned up, the associated material is considered PCB Remediation Waste and subject to the requirements of 40 CFR 761, the RFETS Polychlorinated Biphenyls Management Plan (PRO-673-EWQA-1.5), and the RFETS WSRIC standards. Otherwise, a PCB hazard does not exist.

Asbestos

If any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., >1% by volume), then material is considered asbestos containing material (ACM; 40 CFR 763 and 5 CCR 1001-10) and must be managed as such.

Tolerable Limits on Decision Error

The maximum value for false positive and false negative errors was 5% each, when calculating the number of required radiological total surface activity (TSA) measurements. Statistical error did not apply to asbestos sampling.

Optimization of Plan Design

The following criteria were used to optimize the radiological survey/sampling characterization package:

- Radiological field measurement methods and instrumentation as described in Section 6 of MARSSIM.
- Radiological sampling and preparation for laboratory measurements as described in Section 7 of MARSSIM.
- Use of actual measurement values versus hypothetical values for calculating the number of required survey and sample measurements.

3.2 Radiological Characterization

Radiological characterization was performed to define the nature and extent of radioactive materials that may be present in Trailer 112B. This section reviews the historical radiological data on this trailer and discusses the RLC conducted. Radiological hazards and RLC data are discussed in Section 4.2, and RLC radiological data are presented in Appendices 2 and 3.

3.2.1 Summary of RLC Data Collected

Although historical review indicates no use of DOE radioactive material, insufficient quantitative radiological data exist to designate Trailer T112B as non-impacted pursuant to MARSSIM. Therefore, radiological surveys and scans were performed, and radioactive samples were taken and analyzed. Direct radiological surveys and scans were performed on the interior and exterior of the trailers for removable and total, alpha and beta contamination. Twenty-one (21) radiological samples were taken from the roof of T112B through two separate sampling evolutions, based on elevated alpha results from TSA measurements on the roof.

Radiological survey data are summarized in Appendix 2 with survey location maps, summary tables, and raw data. Radiochemistry sample data are summarized in Appendix 3.

3.2.2 Sampling and Field Measurement Methods, Procedures and Equipment

Radiological surveys, scans and samples were acquired per the following controlling documents:

- *RFETS Radiological and Non-Radiological Trailer 112A-C Characterization Package, Revision 0* (August, 1999)
- *Sampling of Roofing Material from Trailer T112B for Isotopic Analysis* (January, 2000)
- RFETS Pre-Demolition Survey Plan (PDSP) for D&D Facilities
- IWCP T01011426, *Radiological Surveys of Trailers 112 A, B, & C*
- PRO-475-RSP-16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure*
- PRO-476-RSP-16.02, *Radiological Surveys of Surfaces and Structures*
- PRO-477-RSP-16.03, *Radiological Samples of Building Media*
- PRO-478-RSP-16.04, *Radiological Survey/Sample Data Analysis*

Total alpha and beta survey measurements were taken with the NE Electra using a DP-6 probe; removable alpha and beta measurements were taken with the Eberline SAC-4 and BC-4, respectively. Radiological scans for total alpha and beta were taken with the NE Electra at a scan rate of 1.5 inches per second. A DOT radiological screening was performed and then the samples were sent off-site for radiochemical analysis (alpha spectrometry).

A total of 64 surveys were taken at 16 randomly selected locations within each survey unit (Appendix 2). The total number of survey measurements equates to 16 each of the following measurement types: total alpha, total beta, removable alpha, and removable beta. Twenty duplicate measurements (5 for each of the 4 measurement types) were taken as well. The number of total surface and removable alpha measurements for floors, walls, ceilings, and roofs were calculated using MARSSIM guidance, where no radionuclides are assumed in material background. Alpha scans of 10% of the total survey unit surface area were performed at biased (judgmental) locations on accessible surfaces. The scans were biased relative to locations with the greatest potential for

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radioactive contamination based upon routine use of the trailer (i.e., "foot traffic"), and potential for exterior contamination (i.e., airborne fallout). The scan data were recorded as selected maximum values over the entire scan area of interest for the survey unit.

The appropriate number of survey points was calculated and then specific survey locations were selected using a random number generator. The actual measurements were taken in the lower left corner of the associated square meter (as viewed with the map given in Appendix 2). If the survey location was inaccessible, the measurement was obtained as close as possible to the lower left corner, and the new location was annotated on the survey map.

Measurement locations were clearly identified by labels to provide a method of referencing survey results to survey measurement locations. These measurement locations were incorporated into a grid map at survey densities of one square meter. Numerical results of this activity as well as statistical data analyses are detailed in the Appendix 2.

3.2.3 Laboratory Analysis

Radiological samples were collected and analyzed per the controlling documents cited in Section 3.2.2. The primary quality records resulting from radiochemical sampling and analysis are given in Appendix 3, including results, QC results, the data package narrative, and Chain-of-Custody. The two samples acquired from the first sampling evolution were inconclusive: one sample yielded Am-241 concentrations above free-release limits, but could not be confirmed upon re-analysis of the sample. Consequently, a second evolution of sampling was undertaken, with samples and results described below:

- 15 real samples, 1 field duplicate, plus 3 additional real samples were acquired. The 15 samples were acquired at random across the roof in accordance with MARSSIM guidance; a field duplicate was acquired to evaluate sampling precision; and 3 additional samples were acquired to provide a $1m^2$ average value (the first sample evolution yielded one Am-241 hit from a 2 sample set -- an average value was then needed for the square meter in question);

- Results for all DOE-added radionucides were below Required Detection Limits (RDLs), which are also well below 1/2 DCGL values. Average values for the M2 square meter in question were likewise well below free-release levels, regardless of whether the designated 3 or the entire 5 sample results (from the square meter) were averaged.

- Po-210 results exhibited notable consistency across the roof (a mean of 127 dpm/$100cm^2$ and a standard deviation of 19.4 -- only 15% of the mean value), as well as levels comparable to TSA levels measured in the field (between 61 and 220 dpm/$100cm^2$).

3.3 Chemical Characterization

Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present in Trailer 112B. Characterization was based on a review of historical and process knowledge and is presented in this section. Related hazards are discussed in Section 4.3.

3.3.1 Summary of Historical Data

Information on contaminants of concern (i.e., asbestos, beryllium, RCRA/CERCLA constituents, lead in paint, and PCBs) is presented below.

Asbestos: Historical asbestos inspection data exist for T112 B. The insulation in the roof is composed of fiberglass. Six samples of floor tile, wall, and ceiling material were taken in T112B, and of these, 1 floor tile sample was determined to be asbestos-containing.

Beryllium: There is no record of beryllium operations or storage being conducted in the T112B (*D&D Facility Characterization Interview Checklist, Facility Checklist, HRR Manager's Report,* and *List of Known Beryllium Areas*).

The CBDPP conducted an independent beryllium survey of T112B, which confirmed the absence of detectable beryllium contamination. Beryllium smears were collected at five locations in T112B. All results were below the detection limit of 0.1 µg/100 cm^2. The action level for beryllium surface contamination is 0.2 µg/100 cm^2. In light of the known history of the Trailers 112A - C, these results are also considered representative of T112B. No additional sampling for beryllium was conducted.

RCRA/CERCLA Constituents [including metals and volatile and semivolatile organic compounds (VOCs/SVOCs)]: According to historical and process knowledge, no hazardous chemicals were used or stored in T112B, and no hazardous wastes were generated or stored (*D&D Facility Characterization Interview Checklist and Attached Facility Checklist and HRR Manager's Report*). Therefore, sampling for chemical contaminants is unnecessary and was not conducted.

Lead in paint: Paint on the interior and exterior surfaces of the trailer was not characterized for Pb in paint. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream. Therefore, analysis for lead in paint was not required.

Polychlorinated Biphenyls: There is no record of PCB product use or storage in T112B (*D&D Facility Characterization Interview Checklist, Facility Checklist: and HRR Manager's Report*). Therefore, analysis for PCBs within the trailers is unnecessary and was not conducted.

The exterior surfaces of the trailer are painted tan. The interior surfaces of trailer are covered with paneling. Historical data and process knowledge give no reason to suspect that any specialized paints or coatings associated with PCBs were applied to the trailer. In addition, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b) and therefore need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposition are met. Therefore, the trailer was not characterized for PCBs in paint.

Fluorescent light ballasts were inspected by a site electrician. Any PCB-containing ballasts were removed; no leaking ballasts were identified. No further characterization was required.

3.3.2 Summary of RLC Data Collected

Visual inspections of the trailers' roofs, interior and exterior panels, walls, and floors revealed no evidence of chemical spills or releases (i.e., stains, discoloration, odors, or other physical characteristics). Based on historical information presented in Section 3.3.1 and the inspections conducted, RLC sampling for nonradiological contaminants (except asbestos) was not necessary and was not conducted.

4.0 HAZARDS

4.1 Physical Hazards

T112B is structurally in poor condition. The trailer is empty of any hazardous equipment, and is not connected to any utilities such as Site electricity. Physical hazards are controlled by the Site Safety and Industrial Hygiene Program, which is based on OSHA regulations and standard industry practices.

4.2 Radiological Hazards

Based on historical knowledge and the RLC, Trailer T112B is classified as MARSSIM Class 3 and Type I pursuant to the DPP. This trailer does not contain radiological contamination above the free-release limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The only survey result (TSA) above the $DCGL_w$ (Table 4-1 and Appendix 2) is due to Po-210, based on the thorough radiochemistry sampling effort (Table 4-2, Section 3.2.4, and Appendix 3). Po-210 is naturally occurring radioactive material (NORM), the final product resulting from the U-238 decay chain.

4.3 Chemical Hazards

The potential for a hazard due to each of the following contaminants was considered:

- Asbestos.
- Beryllium (Be);
- Lead and other metals;
- VOCs/SVOCs;
- PCBs.

The need for analysis of each potential hazard was evaluated based upon historical and process knowledge, given that the trailer was used exclusively for non-hazardous operations (e.g., folding laundry, and office and equipment storage space). The chemical hazards are summarized in Table 4-3.

Table 4-1 Summary of Radiological Survey Data for T112B

		Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
	DCGL[1]	20		1000		100		5000	
	Survey Points	Min.	Max	Min.	Max.	Min.	Max	Min.	Max
T112B Interior and Exterior (Survey Unit 12B)	16	0.0	3.0	-52.0	60.0		151.0	-303.0	247.0

[1] DCGL – Derived Concentration Guideline Level

Table 4-2 Summary of Radiological Sample Results for T112B Roof

ISOTOPE	Survey Grid Location	Maximum Activity (pCi/g)	MDA (pCi/g)	Converted Max. Activity (dpm/100cm^2)	Converted MDA (dpm/100cm^2)
U-233/234	D1	0.068	0.047	4.0	2.8
U-235	D1	0.017	0.047	1.0	2.8
U-238	E2	0.020	0.040	1.2	2.3
Pu-239/240	G2	0.013	0.117	0.8	6.9
Am-241	M2[1]	0.400	0.088	24.2	5.2
Po-210	K1	2.560	0.124	152.2	7.3

[1] Results from Grid M2 are the average of all sample data collected in that square meter

Asbestos

Historical asbestos inspection data exist for T112 B. The insulation in the roof is composed of fiberglass. Six (6) samples of floor tile, wall, and ceiling material were taken in T112B, and of these, 1 floor tile sample was determined to be asbestos-containing. If related ACM remediation is not performed prior to release, notification of the State and of the waste disposal facility of the presence of asbestos is required. No hazard from *friable* asbestos exists on the trailer. The asbestos data are contained in Appendix 4.

Metals (including beryllium and lead in paint)

According to historical and process knowledge, no metals, including beryllium, were used or stored in the facility, and therefore, no related hazards are present.

The paint on the interior and exterior surfaces of T112B has not been characterized for lead in paint. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of high contamination areas shall be managed as non-hazardous (solid) wastes and need not

be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

VOCs/SVOCs

According to historical and process knowledge, no chemicals were used or stored in the facility, and therefore, no related hazards are present.

PCBs

There is no record of PCB product use or storage in T112B, and therefore, no related hazards are present.

Table 4-3 Summary of T112B Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Below release limit or regulatory thresholds?
Asbestos	One floor tile sample was determined to be asbestos-containing.	Historical	Yes[1].
Beryllium	Surface smears in T112B (considered representative of T112B - C due to trailers being used for non-hazardous activities).	Historical	Yes.
VOCs/SVOCs	No history of use or storage. No characterization was required.	Historical	Yes.
Lead in paint	No characterization was required.	Historical	Yes[2].
PCBs	All PCB ballasts were removed. No specialized paints or coatings were observed. No characterization for PCB in paint was required.	Historical	Yes[3].

1 Notification of the State and of the waste disposal facility of the presence of non-friable asbestos is required.

2 Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be sampled unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

3 Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, states that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b) and therefore need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

5.0 DATA QUALITY ASSESSMENT (DQA)

Data used in making disposition decisions must be of adequate quality. Adequate data quality for decision-making is required by applicable K-H corporate policies (K-H QAPD, 1997, §7.1.4 and 7.2.2), as well as by the customer (DOE, RFFO; Order O 414.1, Quality Assurance, §4.b.(2)(b)). Regulators and the public also expect decisions and data that are technically and legally defensible. Verification and validation of the data ensure that data used in decisions resulting from the RLC are usable and defensible.

The DQA consists of revisiting the DQOs used and determining whether those objectives were met. This data evaluation also consisted of verifying and validating the RLC data, which ensures that data input into decisions are accurate, precise, representative, complete, and comparable.

Original DQOs of the project are stated in §3.1, where problems, decisions, decision inputs, project boundaries, and error tolerances were adequately defined. Decisions for the trailer are that contamination levels are below free-release criteria, for both chemicals and radionuclides. Although asbestos was detected in the floor tiles, it was not friable and thus an asbestos hazard does not exist. No evidence of chemicals were noted (e.g., stains or flourescent light ballasts with PCBs). The conclusion with respect to radiological contamination is derived from measurements at a 95% confidence level using MARSSIM methodology in the survey unit's design. Original estimates of survey quantities were confirmed by using measured values (vs. assumed values) in the sample quantity derivation.

The RLC for T112B was conducted in accordance with the FDPM and the DDCP. These programs conform with the Site's DOE-approved QA Program, which in turn conforms with DOE Order 414.1, *Quality Assurance*. The program also conforms with MARSSIM guidance, which reflects elements of DOE Order 414.1. Adequate implementation of the quality elements required by DOE Quality Assurance was corroborated through the verification and validation process described within this section.

The DQA presented in this section supports conclusions through implementation of the guidelines taken from the following MARSSIM sections:

- §4.9, Quality Control
- §8.2, Data Quality Assessment
- §9.0, Quality Assurance & Quality Control
- Appendix E, Assessment Phase of the Data Life Cycle
- Appendix N, Data Validation using Data Descriptors

The MARSSIM-recommended criteria for verification and validation of pre-demolition (final status) survey data, listed above, are summarized in Table 5-1. The MARRSIM criteria are listed across the top of the table, whereas the project's proof of implementation is listed along the left side of the table. One or more "checks" per column exhibit compliance with the MARSSIM criterion.

MEMO: THE ORIGINAL RECONNAISSANCE-LEVEL REPORT FOR T112B, REVISION 0, DATED 4/3/00 HAD NO PAGE 20 DUE TO A PAGINATION PROBLEM WHEN THE ORIGINAL WAS PRINTED, SIGNED, AND DISTRIBUTED!

Table 5-1 Final Status Survey Compliance with MARSSIM Data Quality Guidelines

Trailer 112B (T112B)	MARSSIM sec 4.9	QAPP	SOPs	Training & Quals (personnel)	calibrations	QC Samples	sample quantities (adequacy of)	precision	MARSSIM sec 8.2	Reviews - DQOs & Sampling Design	"prelim" data review	graphical data review	statistical tests & assumptions	conclusions	MARSSIM sec 9.0	Reports (to decision makers)	site description	analytical methods & MDA/MDC	background radiation	measurement results	Chain-of-Custody	SOPs	Quality records	results by geographic location	defined level of data review	data quality indicators (PARCCS)	QC measurements	MARSSIM Appdx E (DQA)	review DQOs & survey design	select statistical test	verify assumptions (statistics)	draw conclusions	MARSSIM Appdx N	raw data, original data forms	QA assessments/NCRs/CARs	data reduction/calculations	method validation	historical data
Inventory of Report & Project Files	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	
Reconnaissance-Level Characterization Rpt															X	X						X									X							
Executive Summary													X		X				X						X			X			X							
Sec 3.0 Summary of Characterization Activities									X																													
Sec 4.0 Hazards																															X							
Sec 5.0 Data Quality Assessment						X	X		X		X		X					X						X				X			X			X		X		X	
Appendices 2 & 3 (Survey Results, Maps, Data)																			X			X	X															
Project Files	X		X																																			X
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Sampling & Survey Instructions		X																				X																
Total Surface Activity Data Sheets					X												X					X				X												
Removable Contamination Sheets																	X					X				X												
Instrument Data Sheets																	X					X																
Survey Signatures										X	X																											
Grid Survey Maps											X											X	X															
(MARSSIM) PostSurvey Verification worksheets						X																X														X		
Random Start Data Sheets																						X																
Lab Results						X										X		X				X				X												
Chain-of-Custody						X														X		X												X				
Survey Unit Data Summary						X					X							X				X	X													X		
QA/QC																X						X																
Calibrations & Reference (Source) Standards				X																		X																
Sensitivity (MDC) determinations																					X	X																
Periodic Performance Checks				X														X		X	X	X				X								X				
DOCUMENT REVIEWS/COMMENT RESOLUTION									X		X									X	X		X				X											

5.1 VERIFICATION OF RESULTS

Verification ensures that data produced and used by the project are documented and traceable per quality requirements. Verification confirmed that:

- Chain-of-custody was intact from initial sampling though transport and final analysis;
- Preservation and hold-times were within tolerance; and
- Format and content of the data are clearly presented relative to goals of the project.

Verification of the T112B dataset also confirmed the presence of records representing implementation of the following quality controls:

- Calibrations/periodic performance checks (radiochemistry, surveys and scans), for accuracy;
- Laboratory control samples (LCS -- radiochemistry), for accuracy;
- Blanks (radiochemistry), for accuracy;
- Lab and field duplicate measurements, for precision;
- Chemical yield (radiochemistry), for accuracy;
- Count times (radiochemistry surveys and scans), for sensitivity; and
- Sample preparations (radiochemistry), for accuracy, representativeness.

Upon completion of the data management activities listed above, peer and quality assurance reviews were performed on the data and this, the final report.

In summary, the verification confirmed that documentation and quality records are intact for the project, which in turn corroborates implementation of the required technical quality controls and administrative requirements, particularly verification of those documents and records that will ultimately support the CERCLA Administrative Record. This report and all relevant Quality records associated with the project will be submitted to the CERCLA Administrative Record, for permanent storage, within 30 days of approval of the final report.

5.2 VALIDATION OF RESULTS

Validation consisted of a technical review of all data that directly support the RLC decisions. Any limitations of the data relative to project goals are delineated, and the associated data are qualified accordingly. Data were validated relative to quality criteria discussed throughout previously noted MARSSIM sections and the PARCC parameters.

PARCC parameters are consistent with "data descriptors" in MARSSIM and address characteristics of the data that must be defined for scientific integrity and defensibility. The next section, which addresses the PARCC parameters -- Precision, Accuracy, Representativeness, Comparability, and Completeness, also includes discussion on bias and sensitivity, two more data descriptors emphasized in MARSSIM.

Validation of analytical data to K-H contractual requirements (K-H Statements of Work) is currently performed on a site-wide basis at ~25% frequency by the K-H Analytical

Services Division. Satisfactory validation at this frequency indicates that subcontracted laboratories are operating competently relative to industry-wide standards, and more specifically, that sample custody and analytical procedures are implemented under defined quality controls on a site-wide, programmatic basis. Site-wide data validation coupled with annual laboratory audits provide the inference that all analytical results not specifically validated are represented by the percentage that is validated. Radiochemistry performed for this RLC was verified as meeting K-H contractual requirements -- Module RC01-B.3 for alpha spectrometry.

5.2.1 PRECISION

5.2.1.1 Radiological Surveys and Scans

Precision of the radiological instrumentation was satisfactory based on tolerance charting of daily source measurements for each individual sensor used on the project, which includes all measurement types (scans and static measurements for total contamination, and swipes for removable). Adequate precision was established through instrument performance within a ±20% range as defined by measurement results compared to a standard source value. Based on site protocol (i.e., RSPs), any measurement exceeding the defined tolerance limits required corrective action (repair or replacement) prior to the instrument's use during pre-demolition survey.

Duplicate measurements were acquired for total and removable surface activity measurements at ≥20% frequency per survey unit. All duplicate measurements were within tolerance based on the acceptance criterion that both results be below Derived Concentration Guideline Level-Averaged Measures ($DCGL_W$). Note that even if populations were "significantly" different between real and duplicate results, if both duplicate and real population statistics are less than action levels, the difference between duplicate and real values is, ultimately, insignificant relative to free-release decisions.

5.2.1.2 Radiochemistry

Results from laboratory duplicates indicate adequate lab precision based on duplicate results within statistical tolerance values (>90% confidence of equivalency between the original sample and the duplicate). Field duplicate results were within a range less than the $DCGL_W$, indicating a reproducibility adequate for project decisions (i.e., relative to free-release of materials). Lab duplicate results were also within contractual precision tolerances.

As discussed previously, the Am-241 exceedance resulting from the first sampling evolution was not repeatable based on re-analysis of the original bulk sample, nor from averaging samples across the square meter in question, and finally, not from further aggressive sampling across the entire roof of the trailer. In contrast, the repeatability of Po-210 across the entirety of the roof was well established, with a standard deviation value at ~15% of the mean.

5.2.2 ACCURACY (and Bias)

5.2.2.1 Radiological Surveys and Scans

Accuracy of radiological surveys and scans is satisfactory based on RFETS-programmatic annual calibrations that establish instrument efficiencies and sensitivities for all instrumentation used on this project. Daily source checks also provided periodic checks to ensure that all sensors are within tolerance during daily operations. Calibration and calibration check results were within the RFETS and industry-standard requirement of 20% of the applicable reference standard values. Full-scale, multi-point calibrations provided accuracy of ± 10% prior to the use of survey instruments in the field, consistent with guidelines put forth in ANSI-N323.d

Total beta results for Survey Unit 112B may appear to have some low bias based on the many negative values. However, based on the method by which local area backgrounds were attained relative to the real measurements, negative values can be expected. Local area backgrounds for the NE Electra DP6 were determined at approximately 3 ft above ground level outside the trailer location; probes were held face up at waist level and underwent a 1-minute count time. In contrast, trailer-interior measurements are acquired at relatively higher elevations (above grade), and are shielded from much exterior "shine" within the trailer. As a result, the high background and/or low instrument bias would not appear to impact survey unit decisions, as the levels are significantly lower than the free-release action level (5000 dpm/100cm^2).

Removable beta results might also appear to have a slight negative bias based on the majority of performance check results below zero (i.e., within the negative acceptance range). Such instrument performance, when consistently below the standard reference values, suggests that instrument efficiency may need to be adjusted upward for more accurate results. This is due to using an assumed minimum efficiency of 25% for BC 4s when actual efficiencies are higher. However, as discussed above, the magnitude of the negative values does not suggest a potential bias high enough to compromise survey unit decisions.

5.2.2.2 Radiochemistry

Accuracy of the radiochemical results were within tolerance and acceptable based on the associated results of laboratory control samples and calibrations at the laboratory. Preparation blanks also confirmed that no significant cross-contamination occurred in the analysis process. Uncertainties of the radiochemical results are quantified for each sample by 2-sigma error. Uncertainties associated with the alpha-spectrometry analyses were within standard industry magnitudes and did not impact project decisions on the trailer's (DPP) classification as Type 1 (MARSSIM Class 3).

5.2.3 REPRESENTATIVENESS

Samples, surveys and scans are representative based on the following criteria:

- Familiarity with facilities -- multiple walk-downs and collaborations by management and technical staff;
- Implementation of industry-standard chain-of-custody protocols;
- Compliance with sample preservation and hold times;
- Documented and (site) approved methods;
- Radiochemistry - (alpha spectrometry) via K-H Module RC01-B.3 (modified to include analysis for Po-210);
- Radiological surveys and sampling via the RSP 16.00 series;
- *Sampling of Roofing Material from Trailer T112B for Isotopic Analysis*, RF/RMRS-99-332 ;
- *RFETS Radiological and Non-Radiological Trailer 112B Characterization Package, Revision 0* (August, 1999);
- *Pre Demolition Survey Instructions (PDSI) for The 112A-C Trailers.*

Quality Assurance assessments were limited to the DQA presented in this section; no other site assessments were performed.

5.2.4 COMPLETENESS

The data set for this project is complete with respect to surveys scans, samples and associated quality records ("data packages") resulting from the characterization process. Table 5-2 summarizes the minimum required number of samples surveys/scans, the actual quantity of samples/surveys/scans to date, and whether DQOs were achieved.

Table 5-2 Data Completeness Summary

Measurement Type	Required # of Samples/ Surveys/Scans	Actual # of Samples/ Surveys/Scans	Comments
Survey Unit 12B (T112B)			
PLM (asbestos)	6	6	DQO achieved
Eberline SAC-4 (removable alpha)	13	16	DQO achieved
Eberline BC-4 (removable beta)	13	16	DQO achieved
NE Electra (total alpha and beta)	13	16	DQO achieved
Radiochemical	15	21	DQO achieved

Consistent with the DQO process, the sampling design was optimized through back-calculating actual measurement results (acquired during RLC) and comparing model output with original estimates. The Post Survey Removable Contamination Summary Statistics Calculation verification worksheet is included in Appendix 2. Use of actual sample/survey/scan (result) variances in MARSSIM's DQO model provided confirmation that an adequate number of samples/surveys/scans had been acquired. All radiological

and asbestos results are valid without qualification, and form data sets with adequate quantities and quality of data for free-release decisions on the trailer of interest.

5.2.5 COMPARABILITY

All results presented are comparable with radiological survey/scan and radiochemistry data on a site- and DOE-complex wide basis. This comparability is based on:

- Use of standardized engineering units in the reporting of measurement results;
- Consistent sensitivities of measurements at approximately 50% or less of the $DCGL_W$ (approximately 50% or less of the $DCGL_{EMC}$ for scans);
- Use of site-approved procedures;
- Systematic quality controls; and
- Thorough documentation of the planning, sampling/analysis process, and data reduction into formats designed for making decisions based on the project's original data quality objectives.

5.2.6 SENSITIVITY

Adequate sensitivities, in units of dpm/100 cm^2, were attained for all surveys/scans and radiochemical methods implemented based on minimum detectable activities (MDAs) at 50% of the transuranic $DCGL_W$ ($\leq$ 50% $DCGL_{EMC}$ for scans). The nominal MDAs for each survey and radiochemical method are summarized as follows:

- Removable alpha contamination (Eberline SAC-4): 8.3 dpm/100cm^2;
- Removable beta contamination (Eberline BC-4): 200 dpm/100cm^2;
- Total alpha contamination (NE Electra): 49 dpm/100cm^2;
- Total beta contamination (NE Electra): 351 dpm/100cm^2; and
- Radiochemistry (Alpha Spectrometry): 7 dpm/100cm^2 (converted from 0.11 pCi/g Pu-239/240).

5.2.7 OTHER QA ELEMENTS

All personnel performing activities affecting quality within the RLC project were qualified to perform their specific tasks. Suitable training and qualification documentation for personnel performing the work, from the laborers to technical professionals to management, is documented in both the IWCP and the applicable Human Resources department.

5.3 DQA SUMMARY

In summary, the data presented in this report have been verified and are qualified as valid and complete for comparison with free-release criteria (action levels) as stated in the DQOs. All media sampled, surveyed and scanned relative to both total and removable alpha activities yielded results less than action levels for the associated

contaminants of concern. Therefore, Trailer 112B meets the free-release criteria with the statistical confidence stated in this section and throughout the report.

6.0 CLASSIFICATION OF TRAILER T112B

Based on the analysis of radiological, chemical and physical hazards, Trailer T112B is classified as a Type I Facility (i.e., "free of contamination") pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a). Classification is based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate no radioactive or chemical contamination exists and no significant physical hazards are present. Trailer 112B contains asbestos as part of the floor tile, but it is nonfriable and an integral part of the structure.

7.0 REFERENCES

DOE/RFFO, CDPHE, EPA, 1996. Rocky Flats Cleanup Agreement (RFCA), July 19, 1996.

DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

DOE Order 414.1, "Quality Assurance."

EPA, 1994. "The Data Quality Objective Process," EPA QA/G-4.

K-H, 1997. "Kaiser-Hill Team Quality Assurance Program", Rev. 5, 12/97

K-H, 1998a. Decommissioning Program Plan, October 8, 1998.

K-H, 1998b. Facility Disposition Program Manual, MAN-076-FDPM.

K-H, 1999a. Decontamination and Decommissioning Characterization Protocol.

K-H, 1999b. Reconnaissance Level Characterization Plan

MARSSIM – Multi-Agency Radiation Survey and Site Investigation, 12/97 (NUREG-1575, EPA 402-R-97-016).

RFETS, D&D Facility Characterization Interview Checklist and Attached Facility Checklist and HRR Manager's Report

RFETS Chronic Beryllium Disease Prevention Program, "List of Known Beryllium Areas"

RFETS, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*

RFETS, Environmental Waste Compliance Guidance #27, *Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal*

RFETS, *Radiological Safety Practices*

RFETS, Sampling of Roofing Material from Trailer T112B for Isotopic Analysis,

Appendix 1

D&D Facility Characterization Interview Checklist

D&D Facility Characterization Interview Checklist

ID No.: T-112B

Date: 06/21/99

Groups B & C Series

Check List for - Title: D&D Facility Characterization – Interviews

CRITERIA:
- Λ *D&D Characterization Protocol*, RFETS MAN-077-DDCP, Rev. 0
- Λ *Facility Disposition Program Manual*, RFETS MAN-076-FDPM
- Λ RFETS Radiological Safety Practices, January 12, 1998

Facility Name & Type (1, 2, or 3) T-112B, Group C Type 1 Facility, Trailer Office Building

Personnel Interviewed (Name & Title/Function) Karen Peisley, X5193, P212-3535, T-130I, Room 51, I&ET

	-- Y/N --
Does a current WSRIC exist for the facility?	N
If so, are there exceptions to the WSRIC as written?	No WSRIC, No Exceptions

COMMENTS (incl. WSRIC contacts)

WSRIC Contact is James M. Schoen who is in charge of the WSRIC Reports, T130J, X3579, C-83.

Are rad surveys available that indicate current status of the facility?	N
Are historical rad surveys available that indicate historical status, or evolution, of the facility?	N*

COMMENT N* According to Mark R. Richards, X5148 of SSOC any historical data, which is probably at the Federal Center, would not be adequate for unrestricted release. New monitor surveys would have to be taken.

Is an HRR available for the facility?	N
Do any other reports exist beyond the HRR (e.g., spill reports, reportable incidents, etc.) that further Characterize the facility relative to chemical &/or radiological contamination?	N**
Are engineering drawings (esp. "as-builts") available?	N*
Are any nonconformances or issues with the facility status currently being tracked in PATS?	N

If so, what are the issues (note in Comments, below)?

COMMENTS N* Radiological surveys may have been done, but the old data is not available. This unit will have to be resurveyed to meet present standards for unrestricted release. The Plant stopped using lead based paints for office buildings in 1989. If T-112B was painted prior to this date, lead based paints may have been used. N** According to Nick Demos, ER Characterization/HRR Manager, X4605, the T-112B trailer area has no historical information regarding spills to the environment. No engineering drawings, as-builts, and/or sketchs exist for the T-112B facility.

Have any types of chemical characterization, incl. asbestos, been performed recently?	Y*

If so, what types of characterization were performed (note in Comments, below)?

COMMENTS Y* Asbestos characterization data exists, according to Kevin Sheehan, X7250, T-452D, Room C-1. The asbestos data reports are located in Cubicle C-13, of T-452D and the reports are under the control of Kevin Sheehan.

Interviewed by: J. R. Sheets / J R Sheets / 05/19/99

Print Name Signature Interview Date

D&D Facility Characterization Interview Checklist

ID No.: T -112B
Date: 06/21/99

What timeframe did the interviewee work in the facility? N/A The Facility is an Office Building.

From 1997 until March, 1998.

Has the building configuration changed since you worked in the building? If so, in what way?

N/A The Facility is an Office Building. No

What types of equipment were in the building during the interviewee's time there?
In 1998, T-112B was converted to a Telecommunications equipment storage facility. (All of the equipment, as of May 11, 1999, has been removed.)

Where was the equipment located? (specific rooms/areas) The Telecommunications equipment was located in the office cubicles, on the shelves, and on the floors of T-112B.

Were any radioactive materials or metals handled in the building? If so, what types? No, none

Which equipment handled radioactive material? N/A

Were any chemicals handled in the building? If so, what types? N/A

Did any spills or uncontrolled releases of radioactive materials or chemicals occur while you were working in the facility? No, none.

Were these spills/releases cleaned-up? How were they cleaned-up? N/A

Where did these spills/releases occur? N/A

Interviewed by: J. R. Sheets / J R Sheets / 05/19/99

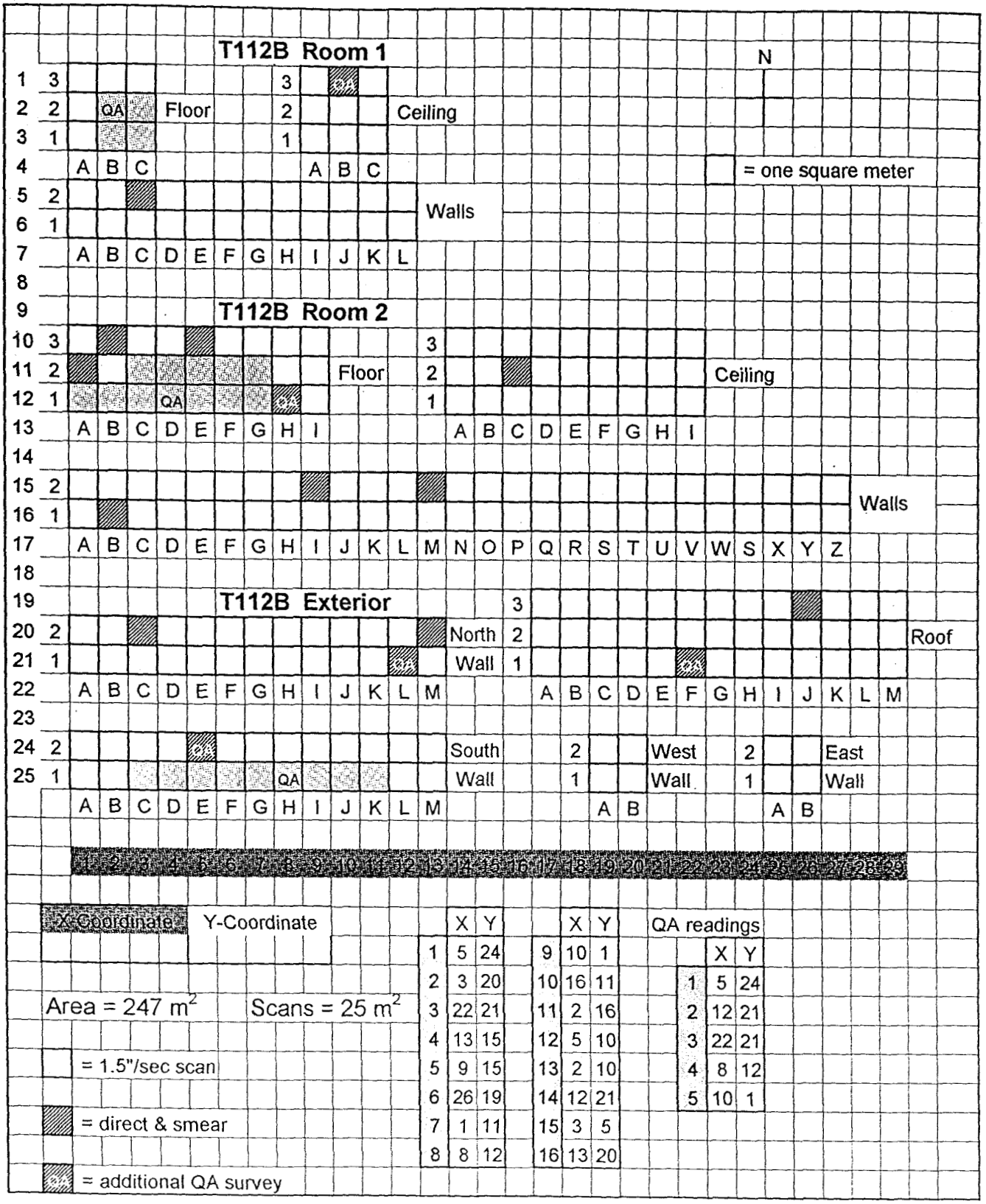
Print Name Signature Interview Date

Appendix 2

Radiological Survey Results for T112B

- Map of Survey Locations
- Summary of Survey Results
- Original Data Sheets

112 Trailers PDS
Unit B - T112B
SURVEY POINTS



	X	Y
1	5	24
2	3	20
3	22	21
4	13	15
5	9	15
6	26	19
7	1	11
8	8	12

	X	Y
9	10	1
10	16	11
11	2	16
12	5	10
13	2	10
14	12	21
15	3	5
16	13	20

QA readings

	X	Y
1	5	24
2	12	21
3	22	21
4	8	12
5	10	1

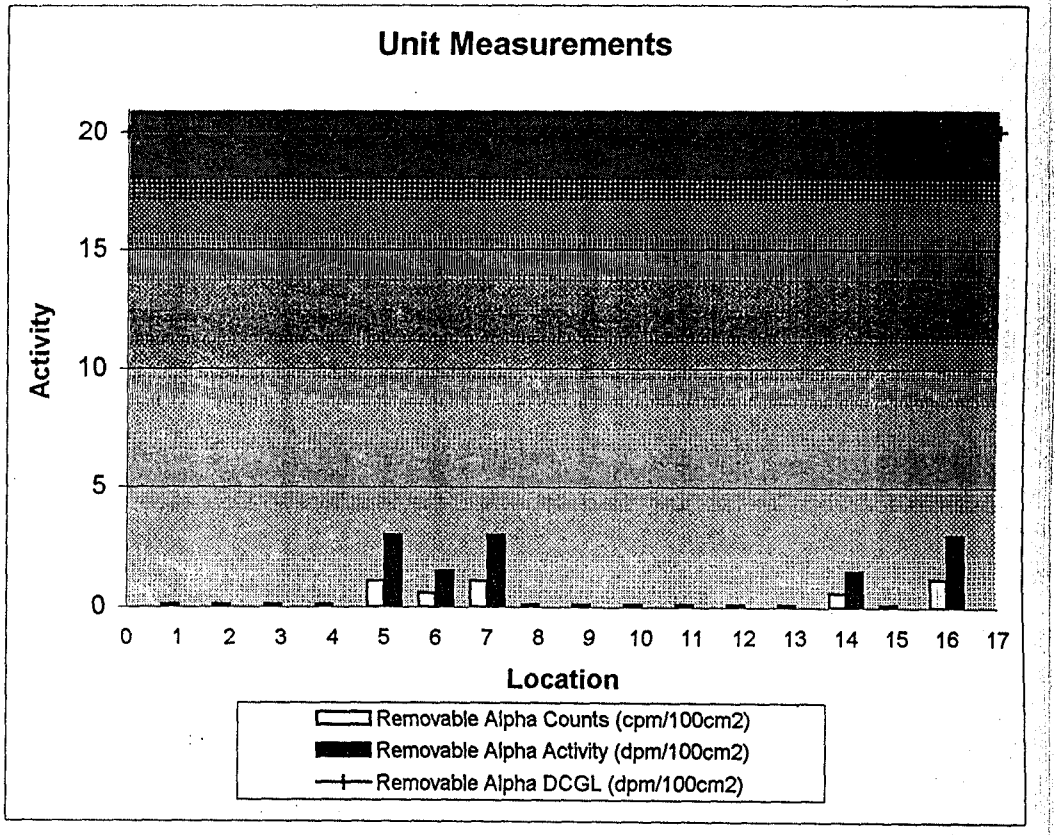
Removable Alpha

Survey Unit B Data Summary - T112B

August 19, 1999

					8/9/1999	8/19/99
standard deviation:	1.224745	max:	3.0	Instrument background:	0.1 cpm	0.2 cpm
mean:	0.75	min:	0.0	Instrument efficiency:	33 %	33 %
median:	0			Instrument MDA:	6.5 dpm	7.5 dpm

	Surface Location			Grid Location	Removable Alpha Counts (cpm/100cm^2)	Removable Alpha Activity (dpm/100cm^2)	Removable Alpha DCGL (dpm/100cm^2)
1	Room	1	Ceiling	B3	0	0	20
2	Room	1	Wall	C2	0	0	20
3	Room	2	Floor	A2	0	0	20
4	Room	2	Floor	B3	0	0	20
5	Room	2	Floor	E3	1	3	20
6	Room	2	Floor	H1	1	1.5	20
7	Room	2	Ceiling	C2	1	3	20
8	Room	2	Wall	B1	0	0	20
9	Room	2	Wall	I1	0	0	20
10	Room	2	Wall	M2	0	0	20
11	Exterior	N	Wall	C2	0	0	20
12	Exterior	N	Wall	L1	0	0	20
13	Exterior	N	Wall	M2	0	0	20
14	Exterior	S	Wall	E2	1	1.5	20
15	Exterior		Roof	F1	0	0	20
16	Exterior		Roof	J3	1	3	20



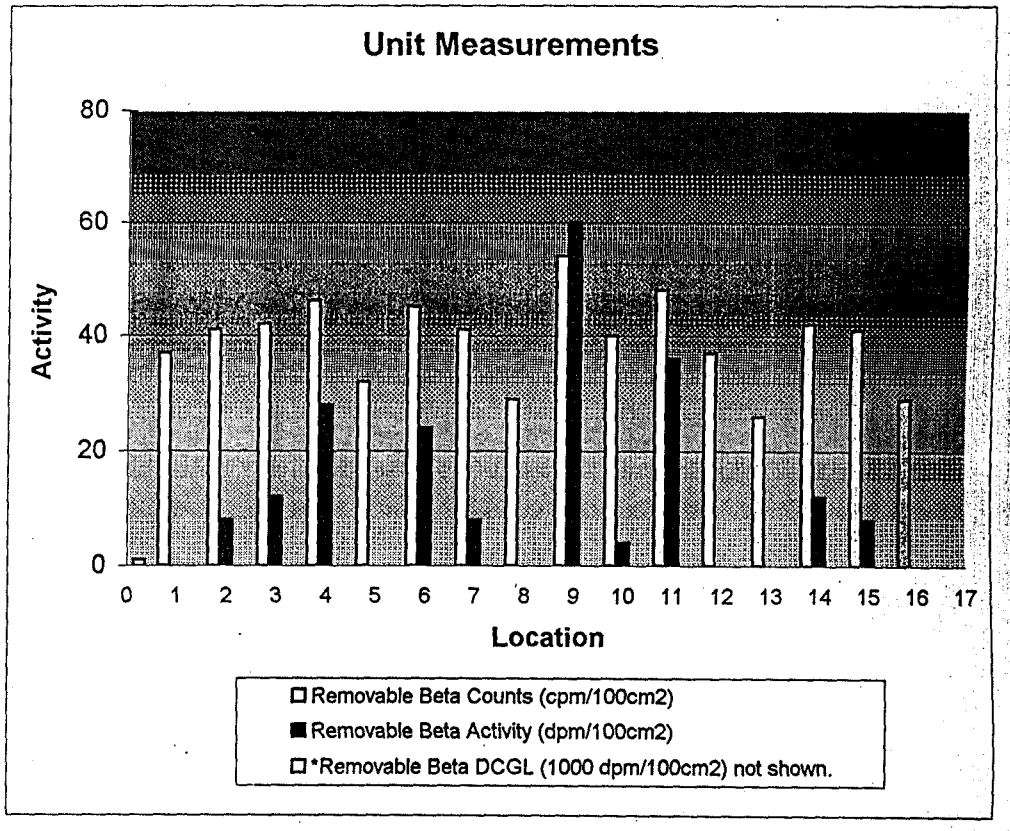
Removable Beta

Survey Unit B Data Summary - T112B

August 19, 1999

					8/9/1999	8/19/99
standard deviation:	30.4182	max:	60.0	Instrument background:	39 cpm	40 cpm
mean:	1.25	min:	-52.0	Instrument efficiency:	25 %	25 %
median:	8			Instrument MDA:	200 dpm	200 dpm

	Surface Location			Grid Location	Removable Beta Counts (cpm/100cm^2)	Removable Beta Activity (dpm/100cm^2)	Removable Beta DCGL (dpm/100cm^2)
1	Room	1	Ceiling	B3	37	-8	1000
2	Room	1	Wall	C2	41	8	1000
3	Room	2	Floor	A2	42	12	1000
4	Room	2	Floor	B3	46	28	1000
5	Room	2	Floor	E3	32	-28	1000
6	Room	2	Floor	H1	45	24	1000
7	Room	2	Ceiling	C2	41	8	1000
8	Room	2	Wall	B1	29	-40	1000
9	Room	2	Wall	I1	54	60	1000
10	Room	2	Wall	M2	40	4	1000
11	Exterior	N	Wall	C2	48	36	1000
12	Exterior	N	Wall	L1	37	-8	1000
13	Exterior	N	Wall	M2	26	-52	1000
14	Exterior	S	Wall	E2	42	12	1000
15	Exterior		Roof	F1	41	8	1000
16	Exterior		Roof	J3	29	-44	1000



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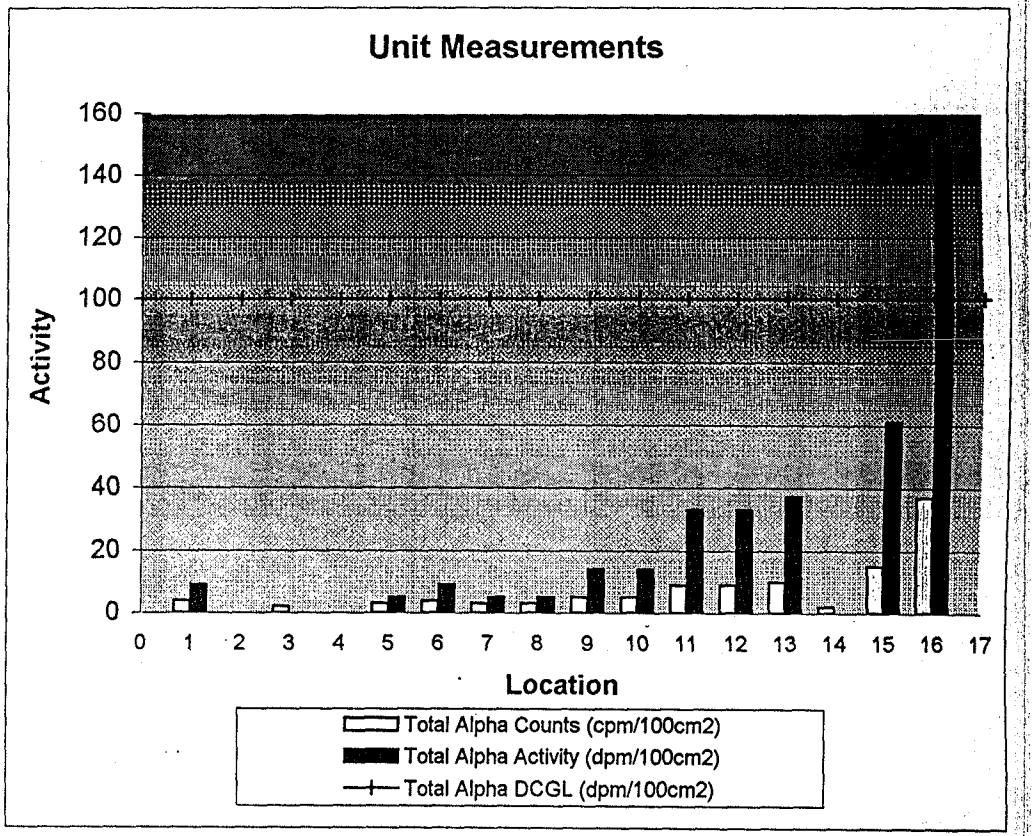
Total Alpha

Survey Unit B Data Summary - T112B

August 19, 1999

					8/9/1999	8/19/99
standard deviation:	39.02969	max:	151.0	Instrument background:	2 cpm	3 cpm
mean:	22.375	min:	-9.0	Instrument efficiency:	21.4 %	22.5 %
median:	9			Instrument MDA:	43 dpm	48 dpm

	Surface Location			Grid Location	Total Alpha Counts (cpm/100cm^2)	Total Alpha Activity (dpm/100cm^2)	Total Alpha DCGL (dpm/100cm^2)
1	Room	1	Ceiling	B3	4	9	100
2	Room	1	Wall	C2	0	-9	100
3	Room	2	Floor	A2	2	0	100
4	Room	2	Floor	B3	0	-9	100
5	Room	2	Floor	E3	3	5	100
6	Room	2	Floor	H1	4	9	100
7	Room	2	Ceiling	C2	3	5	100
8	Room	2	Wall	B1	3	5	100
9	Room	2	Wall	I1	5	14	100
10	Room	2	Wall	M2	5	14	100
11	Exterior	N	Wall	C2	9	33	100
12	Exterior	N	Wall	L1	9	33	100
13	Exterior	N	Wall	M2	10	37	100
14	Exterior	S	Wall	E2	2	0	100
15	Exterior		Roof	F1	15	61	100
16	Exterior		Roof	J3	37	151	100



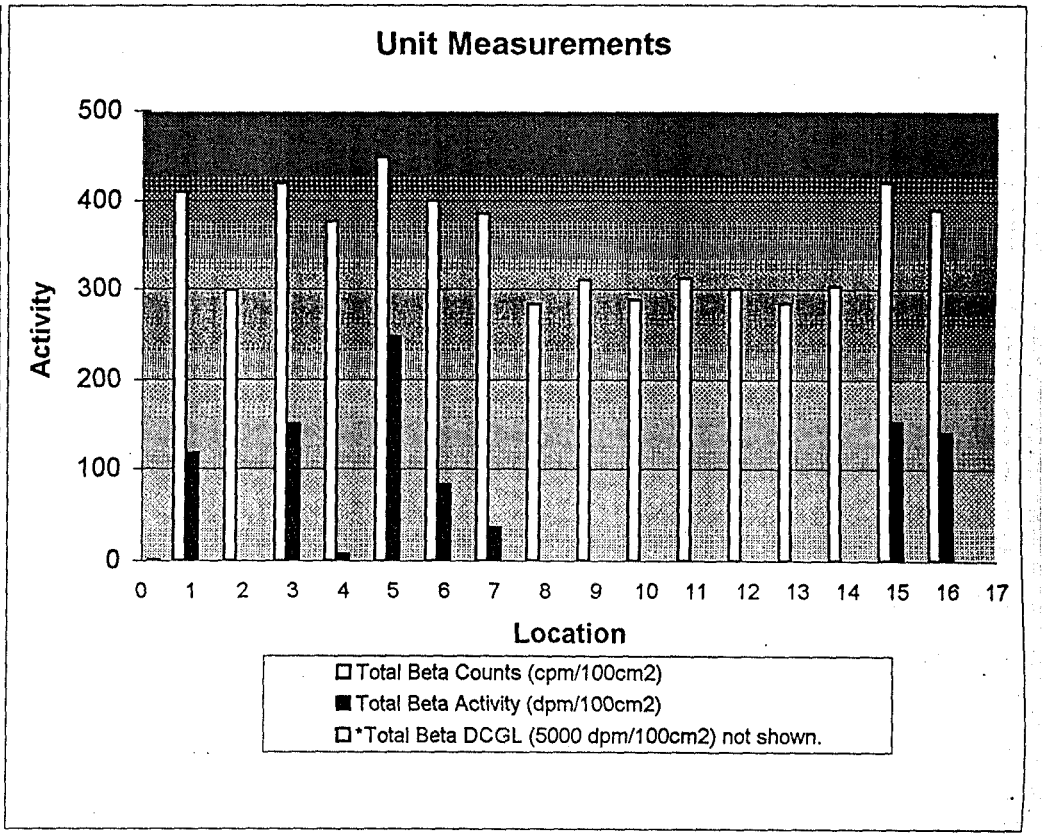
Total Beta

Survey Unit B Data Summary - T112B

August 19, 1999

					8/9/1999	8/19/99
standard deviation:	200.6658	max:	247.0	Instrument background:	374 cpm	346 cpm
mean:	-69.3125	min:	-303.0	Instrument efficiency:	30 %	30.4 %
median:	-100			Instrument MDA:	309 dpm	294 dpm

	Surface Location			Grid Location	Total Beta Counts (cpm/100cm^2)	Total Beta Activity (dpm/100cm^2)	Total Beta DCGL (dpm/100cm^2)
1	Room	1	Ceiling	B3	409	117	5000
2	Room	1	Wall	C2	299	-250	5000
3	Room	2	Floor	A2	419	150	5000
4	Room	2	Floor	B3	376	7	5000
5	Room	2	Floor	E3	448	247	5000
6	Room	2	Floor	H1	399	83	5000
7	Room	2	Ceiling	C2	385	37	5000
8	Room	2	Wall	B1	283	-303	5000
9	Room	2	Wall	I1	310	-213	5000
10	Room	2	Wall	M2	288	-287	5000
11	Exterior	N	Wall	C2	312	-207	5000
12	Exterior	N	Wall	L1	300	-247	5000
13	Exterior	N	Wall	M2	284	-300	5000
14	Exterior	S	Wall	E2	303	-237	5000
15	Exterior		Roof	F1	420	153	5000
16	Exterior		Roof	J3	389	141	5000



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Survey Area: T112	Building: T112B
Survey Unit: B	

Post Survey Removable Contamination Summary Statistics Calculation Verification Worksheet

Step 1:

Conduct a preliminary data review: (the mean, standard deviation, and median of the Unit B removable surface contamination data are calculated on the "Survey Unit B Data" sheet. Because all removable survey measurement results are less than $DCGL_W$ (alpha less than 20 dpm/100 cm^2, beta less than 1000 dpm/100 cm^2), the survey Unit clearly meets the removable contamination release criterion.

Step 2:

Select the statistical tests: The one-sample sign test was selected to assess the data, with $\alpha = 0.05$ and $\beta = 0.05$. The number of sample points calculated was based on the use of this test.

The performance of the sign test was not necessary due to the fact that each individual net result was less than the $DCGL_W$. Thus, the sign test would result in the rejection of the null hypothesis, and conclude that the median concentration of residual radioactivity in the survey unit is less than the $DCGL_W$.

Step 3:

Verify the assumptions of the test: The assumed data variance, as indicated by the assumed standard deviation was verified by re-calculating the required number of smears with the ACTUAL survey unit standard deviation.

The actual removable survey standard deviations for Unit B are: α 1.22 β 30.4

Thus, the ACTUAL required number of measurements is as follows:

α:

$\Delta/\delta = (DCGL_{REMOVABLE} - LBGR_{REMOVABLE})/ SD_{REMOVABLE}$

$\Delta/\delta_{transuranics} = (20\ dpm/100cm^2 - 10\ dpm/100cm^2)/\ 1.22\ dpm/100cm^2 = 8.2$

β:

$\Delta/\delta = (DCGL_{REMOVABLE} - LBGR_{REMOVABLE})/ SD_{REMOVABLE}$

$\Delta/\delta_{transuranics} = (1000\ dpm/100cm^2 - 500\ dpm/100cm^2)/\ 30.4\ dpm/100cm^2 = 16.4$

Where:

Δ/δ	is the relative shift or the resolution of measurements in units of measurement uncertainty
$DCGL_{REMOVABLE}$	is the removable surface contamination derived concentration guideline value (DOE Order 5400.5 removable surface contamination limit equals 20 dpm/100cm^2 for transuranics per the T112A-C Pre Demolition Survey Plan)
$LBGR_{REMOVABLE}$	is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor (set equal to value utilized in original sample size calculation).
$SD_{REMOVABLE}$	is the ACTUAL standard deviation of the removable surface contamination measurements

Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5.4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR). The Sign P value from Table 5.4, equals 0.998650 for a relative shift of 3.0 (The highest published value is utilized for conservatism).

Survey Area: T112	Building: T112B
Survey Unit: B	

Post Survey Removable Contamination Summary Statistics Calculation Verification Worksheet

Step 3: Continued

Determine the number of removable surface contamination measurements for the applicable survey unit using the following MARSSIM, Section 5.5.2.3 formula that is based on radioactive contaminants of concern not being present in the background:

α

$N = (1.645 + 1.645)^2 / 4(\text{Sign P} - 0.5)^2$

$N = (1.645 + 1.645)^2 / 4(0.998650-0.5)^2 = \underline{10.9}$

β

$N = (1.645 + 1.645)^2 / 4(\text{Sign P} - 0.5)^2$

$N = (1.645 + 1.645)^2 / 4(0.998650-0.5)^2 = \underline{10.9}$

Where:

1.645 is the alpha and beta decision error value (95% confidence) per the T112A-C Pre Demolition Survey Plan

Sign P equals 0.998650

Step 4: Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5.5.2.3.

$N = \underline{10.9} * 1.2 = \underline{13}$

Conclusion: Utilizing a conservative relative shift value of 3.0, a minimum of 13 α and β Removable Surface Contamination measurements were required in Unit B.

Step 4:

Draw conclusions from the data: All measurements are less than $DCGL_W$. The minimum number of required removable survey measurements were collected. Thus, survey Unit B complies with the removable contamination release criteria.

DAVE BARNES	[redacted]		4-6-00
Prepared By: Printed Name		Radiological Engineer Signature	Date
ESTABROOKS			4/6/00
Reviewed By: Printed Name		Radiological Engineer Signature	Date

Survey Area: T112	Building: T112B
Survey Unit: B	

Post Survey Total Surface Activity Summary Statistics Calculation Verification Worksheet

Step 1:

Conduct a preliminary data review: (the mean, standard deviation, and median of the Unit B data are calculated on the "Survey Unit B Data" sheet. Because all total surface activity (TSA or TSC) measurement results are less than $DCGL_W$ (less than 100 dpm/100 cm^2) , the survey Unit clearly meets the TSA release criterion.

A graphical data review was also performed on the attached form.

Step 2:

Select the statistical tests: The one-sample sign test was selected to assess the data, with $\alpha = 0.05$ and $\beta = 0.05$. The number of sample points calculated (see "Total Surface Activity Measurement Calculation Worksheet") was based on the use of this test. A local area background (LAB) value was subtracted from each gross measurement to calculate a net result, thus the sign test applies (sign test is typically applied only when the contaminant is not present in background).

The sign test concludes that the median concentration of residual radioactivity in the survey unit is less than the $DCGL_W$.

Step 3:

Verify the assumptions of the test: The assumed data variance, as indicated by the assumed standard deviation was verified by re-calculating the required number of samples with the ACTUAL survey unit standard deviation.

The actual total surface contamination standard deviations for Unit B are: α 39.0 β 201

Thus, the ACTUAL required number of samples is as follows:

$$\Delta/\delta = (DCGL_{TSA} - LBGR_{TSA})/ SD_{TSA}$$

α

$$\Delta/\delta_{transuranics} = (100 \text{ dpm}/100\text{cm}^2 - 50 \text{ dpm}/100\text{cm}^2)/ 39.0 \text{ dpm}/100\text{cm}^2 = 1.28$$

β

$$\Delta/\delta_{transuranics} = (5000 \text{ dpm}/100\text{cm}^2 - 2500 \text{ dpm}/100\text{cm}^2)/ 201 \text{ dpm}/100\text{cm}^2 = 12.4$$

Where:

Δ/δ	is the relative shift or the resolution of measurements in units of measurement uncertainty
$DCGL_{TSA}$	is the total surface Activity derived concentration guideline value (DOE Order 5400.5 total surface Activity limit equals 100 dpm/100cm^2 for transuranics and 5000 dpm/100cm^2 for uranium, per the T112A-C Pre Demolition Survey Plan)
$LBGR_{TSA}$	is the lower bound of the gray region – the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor (set equal to the value utilized in the original sample size calculation).
SD_{TSA}	is the ACTUAL standard deviation of the total surface Activity

Determine the Sign P value by looking up the relative shift (Δ/δ) in Table 5.4 of MARSSIM (the Sign P value is the estimated probability that a random measurement from the survey unit will be less than the DCGL when the survey unit median is actually at the LBGR). The Sign P value from Table 5.4, equals 0.998650 for a relative shift of 3.0 (Actual value approaches one. The highest published value is utilized for conservatism).

Survey Area: T112	Building: T112B
Survey Unit: B	

Post Survey Total Surface Activity Summary Statistics Calculation Verification Worksheet

Step 3: Continued

Determine the number of TSA surface Activity measurements for the applicable survey unit using the following

MARSSIM, Section 5.5.2.3 formula that is based on Plutonium contaminants not being present in the background:

α and β

$N = (1.645 + 1.645)^2 / 4(\text{Sign P} - 0.5)^2$

$N = (1.645 + 1.645)^2 / 4(0.998650-0.5)^2 = \underline{10.9}$

Where:

1.646 is the alpha and beta decision error value (95% confidence) per the T112A-C Pre Demolition Survey Plan

Sign P equals 0.998650

Step 4: Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5.5.2.3.

$N = \underline{10.9} * 1.2 = \underline{13}$

Conclusion: Utilizing a conservative relative shift value of 3.0, a minimum of 13 Total Surface Activity measurements were required in Unit B.

Step 4:

Draw conclusions from the data: The average of all measurements is less than $DCGL_W$. The minimum number of required TSA measurements were collected. Thus, survey Unit B complies with the TSA release criteria.

DAVE BARNES	[redacted]		4-6-00
Prepared By: Printed Name		Radiological Engineer Signature	Date
ESTABROOKS			4/6/00
Reviewed By: Printed Name		Radiological Engineer Signature	Date

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSTRUMENT DATA

Mfg.	Eberline	Mfg.	Eberline	Mfg.	
Model	SAC-4	Model	SAC-4	Model	
Serial#	835	Serial#	824	Serial#	
Cal Due	10/26/99	Cal Due	10/13/99	Cal Due	N/A
Bkg.	0.1 cpm	Bkg.	0.1 cpm	Bkg.	
Efficiency	33 %	Efficiency	33 %	Efficiency	
MDA	6.5 dpm	MDA	6.5 dpm	MDA	

Mfg.	Eberline	Mfg.	Eberline	Mfg.	NEtech
Model	BC-4	Model	BC-4	Model	Electra
Serial#	700	Serial#	770	Serial#	2356
Cal Due	10/22/99	Cal Due	1/7/00	Cal Due	8/18/99
Bkg.	39 cpm	Bkg.	37 cpm	Bkg.	2 | 374 cpm
Efficiency	25 %	Efficiency	25 %	Efficiency	21.4 | 30.0 %
MDA	200 dpm	MDA	200 dpm	MDA	43 | 309 dpm

Survey Type: CONTAMINATION SURVEY
Building: T112B
Location: 280 Yard
Purpose: MARSSIM Release Survey

RWP #: N/A

Date: 08-09-99 Time: 15:30

RCT: Hersey / Hersey
Print name Signature

RCT: Espinoza / Espinoza
Print name Signature

[redacted]

PRL #:

Comments: All Scans were approx. around background except for the ones noted below | hi readings on scan
#15 & #16 ave. 225 dpm/100cm2 alpha and 420 dpm/100cm2 beta fixed plus remov. | #15= 150 dpm alpha, <309 dpm beta
Alpha removable was a two minute count. | #16= 220 dpm alpha, <309 dpm beta

SURVEY RESULTS

Swipe #	Location/Description (Results in DPM/100CM²)	Removable Alpha	Removable Beta	Total Alpha	Total Beta
1	T112B ROOM 1 CEILING B3 *	<6.5	<200	<43	<309
2	T112B ROOM 1 WALL C2	<6.5	<200	<43	<309
3	T112B ROOM 2 FLOOR A2	<6.5	<200	<43	<309
4	T112B ROOM 2 FLOOR B3	<6.5	<200	<43	<309
5	T112B ROOM 2 FLOOR E3	<6.5	<200	<43	<309
6	T112B ROOM 2 FLOOR H1 *	<6.5	<200	<43	<309
7	T112B ROOM 2 CEILING C2	<6.5	<200	<43	<309
8	T112B ROOM 2 WALL B1	<6.5	<200	<43	<309
9	T112B ROOM 2 WALL I2	<6.5	<200	<43	<309
10	T112B ROOM 2 WALL M2	<6.5	<200	<43	<309
11	T112B EXTERIOR NORTH WALL C2	<6.5	<200	<43	<309
12	T112B EXTERIOR NORTH L1 *	<6.5	<200	<43	<309
13	T112B EXTERIOR NORTH WALL M2	<6.5	<200	<43	<309
14	T112B EXTERIOR SOUTH WALL E2 *	<6.5	<200	<43	<309
15	T112B EXTERIOR ROOF F1 *	<6.5	<200	61	<309
16	T112B EXTERIOR ROOF J3	<6.5	<200	220	<309

N/A

Swipe #	Location/Description (Results in DPM/100CM²)	Removable Alpha	Removable Beta	Total Alpha	Total Beta
QA	#1			<43	<309
QA	#6			<43	<309
QA	#12	N/A		<43	<309
QA	#14			<43	<309
QA	#15			51	<309

N/A

Date Reviewed: 8/13/99 RS Supervision: S Engelhardt / [signature]
Print Name Signature

[redacted]

	removable counts		total counts	
	alpha	beta	alpha	beta
1	0	37	4	409
2	0	41	0	299
3	0	42	2	419
4	0	46	0	376
5	2	32	3	448
6	1	45	4	399
7	2	41	3	385
8	0	29	3	283
9	0	54	5	310
10	0	40	5	288
11	0	48	9	312
12	0	37	9	300
13	0	26	10	284
14	1	42	2	303
15	0	41	15	420
16	3	55	49	463
17				
18				
19				
20				
21			3	361
22			1	435
23			7	331
24			2	284
25			13	443
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSRUMENT DATA

Mfg. EBERLINE	Mfg. EBERLINE	Mfg. NE
Model SAC-4	Model SAC-4	Model ELECTRA
Serial# 861	Serial# 842	Serial# 1425
Cal Due 12/7/99	Cal Due 12/9/99	Cal Due 8/25/99
Bkg. 0.3	Bkg. 0	Bkg. 2 / 548
Efficiency 0.33	Efficiency 0.33	Efficiency .21 / .316
MDA <20	MDA <20	MDA 44 / 366
Mfg. EBERLINE	Mfg. EBERLINE	Mfg.
Model BC-4	Model BC-4	Model
Serial# 704	Serial# 702	Serial#
Cal Due 9/25/99	Cal Due 11/20/99	Cal Due
Bkg. 36	Bkg. 43	Bkg.
Efficiency 0.25	Efficiency 0.25	Efficiency
MDA <200	MDA <200	MDA

Survey Type: CONTAMINATION
Building: T-112 B
Location: Roof
Purpose: Pre & Post-Job Survey

RWP #: N/A

Date: 07/21/99 Time: 1370

RCT: S. Jablkowski / [signature] [redacted]
Print name Signature

RCT: N/A / / /
Print name Signature Emp. #

PRL #: NA

Comments: Pre & Post-Job survey on roof for sampling.
(SEE MAP)

SURVEY RESULTS Map

Swipe #	Location/Description Results in DPM/100sq cm	Removable Alpha	Removable Beta	Total Alpha	Total Beta	Swipe #	Location/Description Results in DPM/100sq cm	Removable Alpha	Removable Beta	Total Alpha	Total Beta
1	See Map	<20	<200	<44	<366						
2		<20	<200	<44	<366						
3		<20	<200	<44	<366						
4		<20	<200	12	<366						
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

7-21-99

Date Reviewed: 7/21/99 RS Supervision: S Engelhard / [signature] [redacted]
Print Name Signature

Rev. 05/98

45

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSRUMENT DATA

Mfg. EBERLINE	Mfg. EBERLINE	Mfg. NE
Model SAC-4	Model SAC-4	Model ELECTRA
Serial# 861	Serial# 842	Serial# 1425
Cal Due 12/7/99	Cal Due 12/9/99	Cal Due 8/25/99
Bkg. 0.3	Bkg. 0	Bkg. 2 / 548
Efficiency 0.33	Efficiency 0.33	Efficiency .21 / .316
MDA <20	MDA <20	MDA 44 / 366
Mfg. EBERLINE	Mfg. EBERLINE	Mfg.
Model BC-4	Model BC-4	Model
Serial# 704	Serial# 702	Serial#
Cal Due 9/25/99	Cal Due 11/20/99	Cal Due
Bkg. 36	Bkg. 43	Bkg.
Efficiency 0.25	Efficiency 0.25	Efficiency
MDA <200	MDA <200	MDA

Survey Type: CONTAMINATION
Building: T-112 A & B
Location:
Purpose: Unrestricted Release

RWP #: N/A

Date: 07/21/99 Time: 1445

RCT: S. Jablkowski [signature] [redacted]
Print name Signature

RCT: / /
Print name Signature Emp. #

PRL #: 99-549-169

Comments: (8) Sampling bottles, #99A8967-001.001 ,001.002, 002.001, 002.002, 003.001, 003.002, 004.001, 004.002
(SEE MAP)

SURVEY RESULTS Map

Swipe #	Location/Description Results in DPM/100sq cm	Removable Alpha	Removable Beta	Total Alpha	Total Beta	Swipe #	Location/Description Results in DPM/100sq cm	Removable Alpha	Removable Beta	Total Alpha	Total Beta
1	See Map	<20	<200	<44	<366						
2		<20	<200	<44	<366						
3		<20	<200	<44	<366						
4		<20	<200	<44	<366						
5		<20	<200	<44	<366						
6		<20	<200	<44	<366						
7		<20	<200	<44	<366						
8		<20	<200	<44	<366						
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

7-21-99

7-21-99

Date Reviewed: 7-21-99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name Signature

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSRUMENT DATA

Mfg.	SAIC	Mfg.	Mfg.
Model	AP-2	Model	Model
Serial#	A146	Serial#	Serial#
Cal Due	Oct-99	Cal Due	Cal Due
Bkg.	N/A	Bkg.	Bkg.
Efficiency	N/A	Efficiency	Efficiency
MDA	N/A	MDA	MDA
Mfg.		Mfg.	Mfg.
Model		Model	Model
Serial#		Serial#	Serial#
Cal Due		Cal Due	Cal Due
Bkg.		Bkg.	Bkg.
Efficiency		Efficiency	Efficiency
MDA		MDA	MDA

Survey Type: Alpha Spectroscopy
Building: 280
Location: Yard
Purpose: Customer/Custodian Request

RWP #: N/A

Date: 09/23/99 Time: 1400

RCT: R. E. Read / [signature] [redacted]
Print name Signature

RCT N/A / N/A / N/A
Print name Signature Emp. #

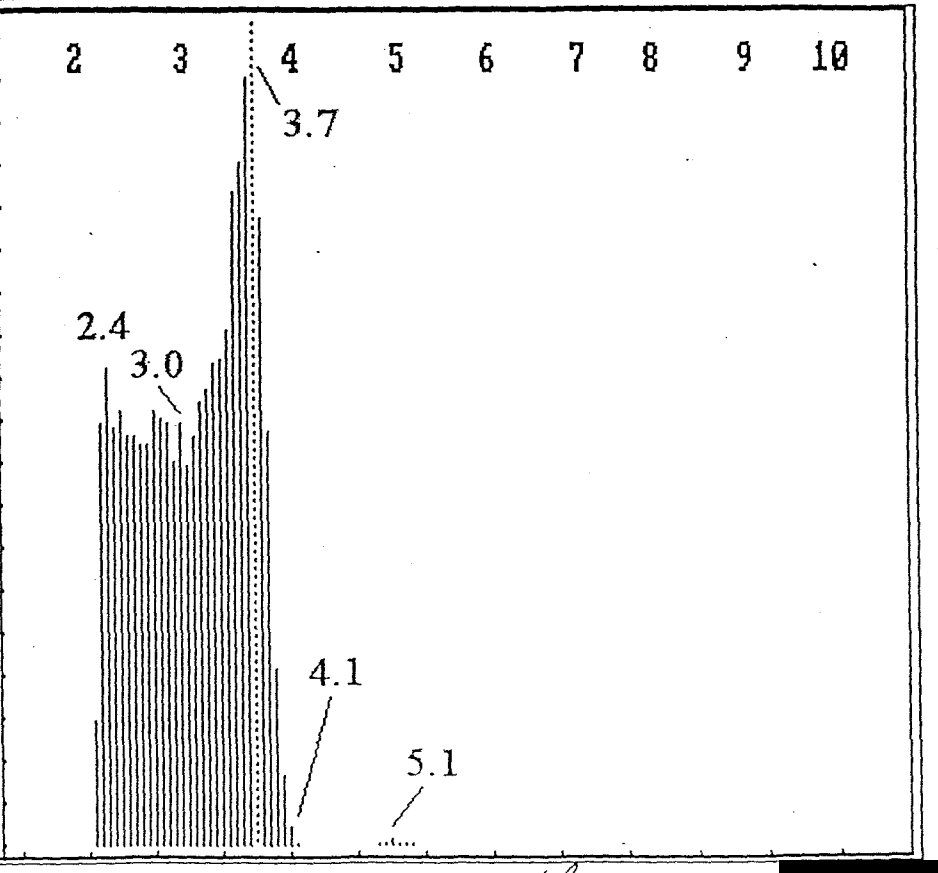
PRL #: N/A
Comments: Radon backround was exceptionally high the day of and during the 60 minute count time.

SURVEY RESULTS

990923.SPE MEV>
REC# 2 OF 2

MIN: 0
MAX: 1205
RANGE: 1205
SCALE: MIN to MAX
Cursor MEV: 3.7
COUNT: 1205
Pu239 Cts: 79
Radon Cts: 6
Gross Cts: 19.2K
Count Time: 60 min.
AP-2 SN# A146

Item Description:
Galvanized Roof on old T112B.



Date Reviewed: 9-23-99 RS Supervision: LN Cooper / [signature] [redacted]
Print Name Signature

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

INSRUMENT DATA

Mfg.	SAIC	Mfg.	Mfg.
Model	AP-2	Model	Model
Serial#	A146	Serial#	Serial#
Cal Due	Oct-99	Cal Due	Cal Due
Bkg.	N/A	Bkg.	Bkg.
Efficiency	N/A	Efficiency	Efficiency
MDA	N/A	MDA	MDA
Mfg.		Mfg.	Mfg.
Model		Model	Model
Serial#		Serial#	Serial#
Cal Due		Cal Due	Cal Due
Bkg.		Bkg.	Bkg.
Efficiency		Efficiency	Efficiency
MDA		MDA	MDA

Survey Type: Alpha Spectroscopy
Building: T112B
Location: Metal Roof
Purpose: RSP/RF RCM Compliance

RWP #: N/A

Date: 07/21/99 **Time:** Day

RCT: R. E. Read / [signature] [redacted]
Print name / Signature

RCT N/A / N/A / N/A
Print name / Signature / Emp. #

PRL #: N/A

Comments: 82 gross Counts is barely adequate for spectrum data.

SURVEY RESULTS

990721.SPE
REC# 3 OF 3

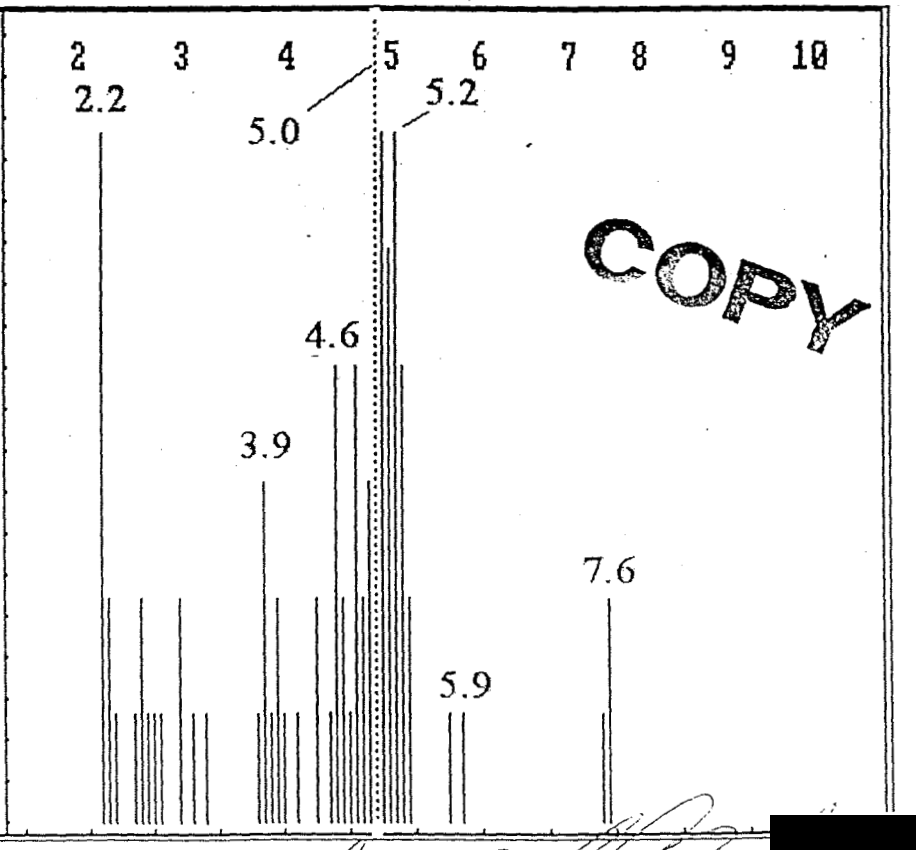
MIN: 0
MAX: 7
RANGE: 7
SCALE: MIN to MAX

Cursor MEV: 5.0
COUNT: 7

Pu239 Cts: 44
Radon Cts: 4
Gross Cts: 82
Count time: 69 min

AP-2 SN# A146

Item Description: Metal Roof T112B
Location# 1



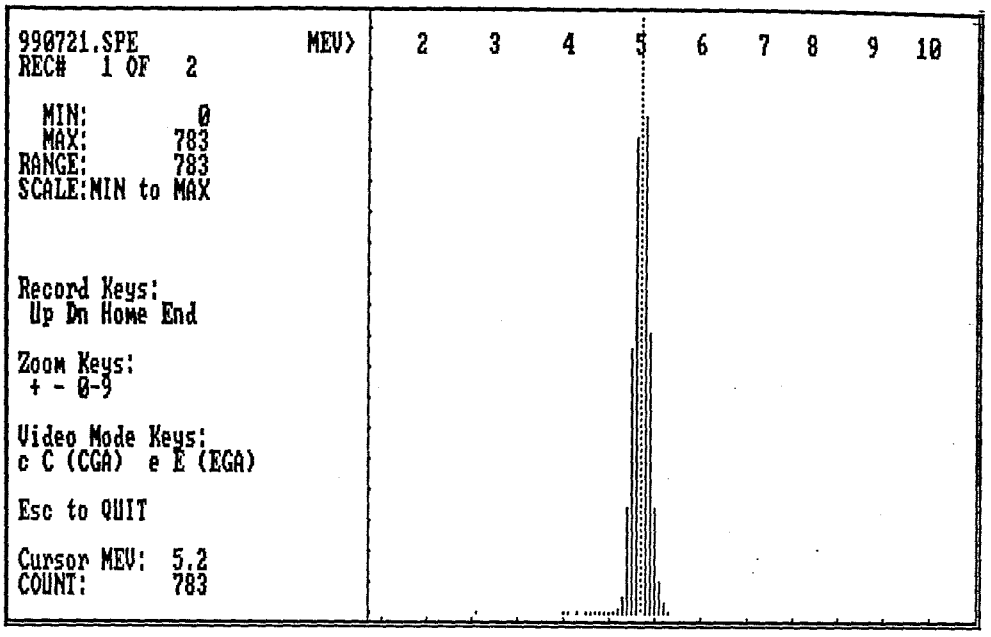
Date Reviewed: 8/11/99 **RS Supervision:** S E Mallard / [signature] [redacted] #
Print Name / Signature

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

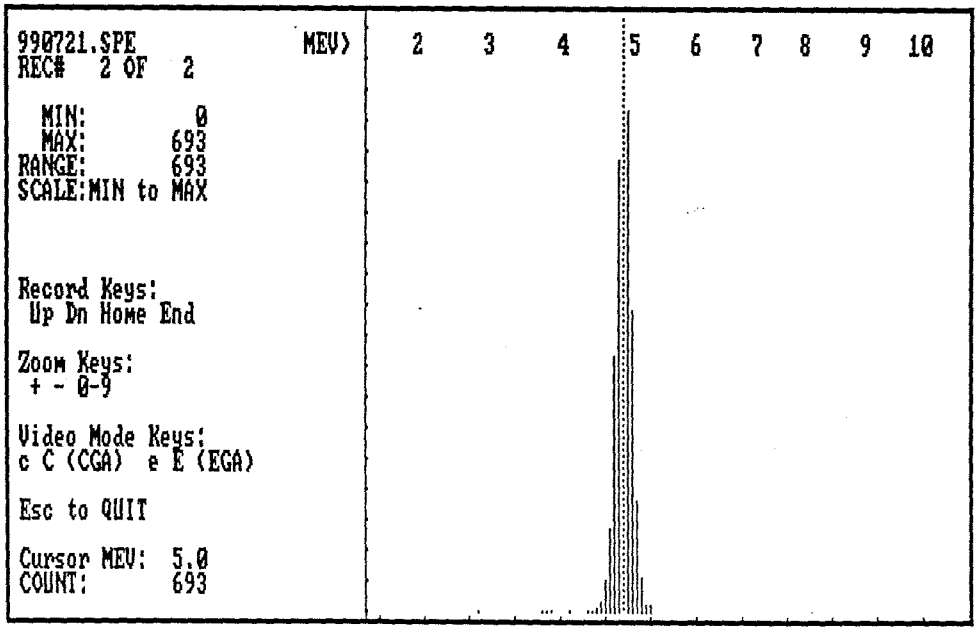
RADIOLOGICAL SAFETY

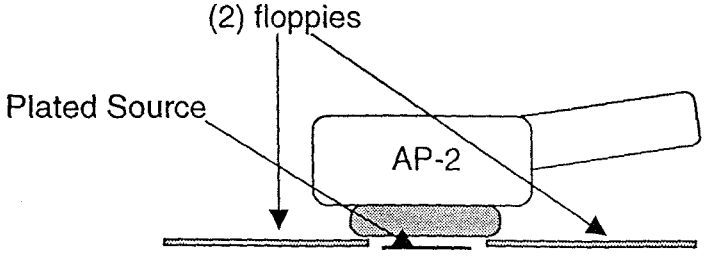
Drawing Showing Survey Points

This spectrum was taken with probe directly on the surface of the plated source.



This spectrum was taken with probe approx. 1/8th in above surface of the same source.



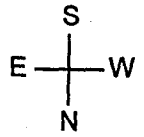


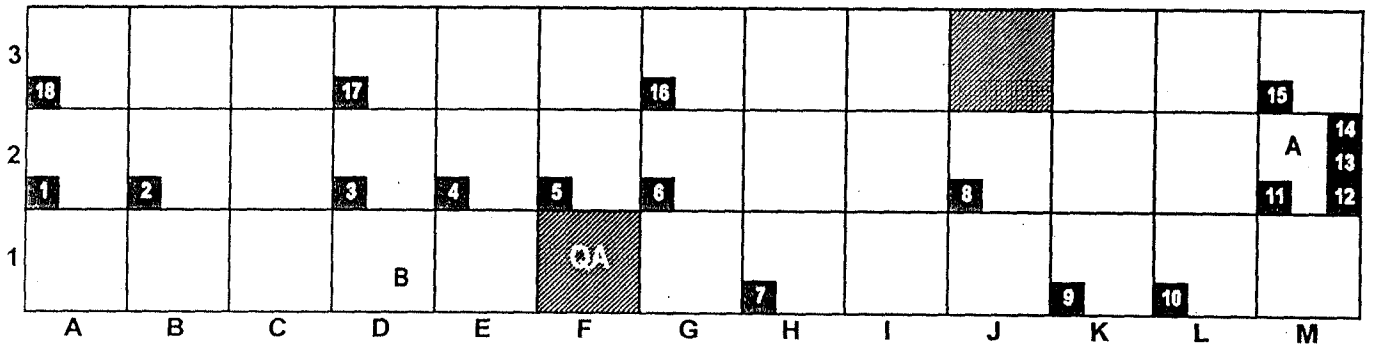
Appendix 3

Radiological Media Sample Results for T112B Roof

- Map of Sample Locations
- First Sample Evolution
  - Radioanalytical Results
  - Case Narrative
  - Chain of Custody
- Second Sample Evolution
  - Trailer 112B Tabulated Roof Media Sample Results
  - Sample QC and Results Summary
  - Data Package Narrative
  - Chain of Custody

Trailer 112B Roof Sample Locations





* Note: Roof was 100% scanned - no high points were noted.

= one square meter (39 total)

\# = sample location (random)

= original direct & smear survey areas (random)

QA = original additional QA survey location (random)

X = original sample areas (judgemental)

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Southeastern Environmental Laboratory

Radioanalytical Results

COPY

Report Identification Number: 99A8967

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	99A8967#002	Matrix:	Waste
Site Sample ID:	003.002				
Other Sample ID:	T112 B NW CORNER	Collection Date:	7/21/99	Date Received:	7/27/99
		Batch Number:	1643	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1643-03	0.030	0.049	0.050	0.076
ACW03	U-235	KH199-1643-03	0.000	0.000	0.000	0.045
ACW03	U-238	KH199-1643-03	0.035	0.048	0.048	0.064
ACW03	PU-239/240	KH199-1643-03	0.022	0.044	0.044	0.059
ACW03	AM-241	KH199-1643-03B	2.37	0.740	0.879	0.119

	Quality Control Samples		
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Pu	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Am	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB

1000 Monticello Court * Montgomery, Alabama * 36117 * 334.272.2234 * FAX 334.213.0407

020

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Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

COPY

Report Identification Number: 99A8967

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	99A8967#002	Matrix:	Waste
Site Sample ID:	004.002				
Other Sample ID:	T112 B NE CORNER	Collection Date:	7/21/99	Date Received:	7/27/99
		Batch Number:	1643	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1643-04	0.068	0.061	0.062	0.037
ACW03	U-235	KH199-1643-04	0.017	0.033	0.034	0.045
ACW03	U-238	KH199-1643-04	0.013	0.027	0.027	0.037
ACW03	PU-239/240	KH199-1643-04	-0.010	0.020	0.020	0.117
ACW03	AM-241	KH199-1643-04B	0.000	0.000	0.000	0.088

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Pu	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Am	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results

COPY

Quality Control Sample Evaluation

Report Identification Number: 99A8967

Project Name: Kaiser-Hill | Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (dpm)	(OV) Laboratory Control Sample Activity (dpm)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1643-LC1	4.24 ∓ 0.117	4.38 ∓ 1.17	103	0.191
ACW03	PU-239/240	SCAQC-1643-LC1	4.55 ∓ 0.100	5.13 ∓ 1.37	113	0.673
ACW03	U-233/234	SCAQC-1643-LC1	8.02 ∓ 0.321	7.25 ∓ 1.75	90.3	0.660
ACW03	U-238	SCAQC-1643-LC1	8.02 ∓ 0.321	7.74 ∓ 1.86	96.4	0.231

Laboratory Duplicate Sample (LD1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1643-LD1	0.264 ∓ 0.129	0.244 ∓ 0.133	0.020	0.106
ACW03	U-235	SCAQC-1643-LD1	0.016 ∓ 0.031	0.018 ∓ 0.037	0.003	0.055
ACW03	U-238	SCAQC-1643-LD1	0.270 ∓ 0.132	0.170 ∓ 0.109	0.100	0.587
ACW03	PU-239/240	SCAQC-1643-LD1	0.000 ∓ 0.000	0.041 ∓ 0.059	0.041	0.696
ACW03	AM-241	SCAQC-1643-LD1	0.000 ∓ 0.000	0.054 ∓ 0.078	0.054	0.695

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Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

Report Identification Number: 99A8967

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: N/A		
Other Sample ID: PB	Collection Date: 7/27/99	Date Received: 7/27/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1643-PB	0.043	0.049	0.050	0.039
ACW03	U-235	SCAQC-1643-PB	0.000	0.000	0.000	0.048
ACW03	U-238	SCAQC-1643-PB	0.079	0.071	0.072	0.068
ACW03	PU-239/240	SCAQC-1643-PB	0.000	0.000	0.000	0.056
ACW03	AM-241	SCAQC-1643-PB	0.000	0.000	0.000	0.053

COPY

Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Pu	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Am	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB

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Radioanalytical Results

RE-COUNT

Report Identification Number: 99A8967

Project Name: Kaiser-Hill	Chain-of-Custody Number: 99A8967#002		Matrix: Waste
Site Sample ID: 005.002			
Other Sample ID: T112 B NW CORNER	Collection Date: 7/21/99	Date Received:	7/27/99
	Batch Number: 1643	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1643-05	0.050	0.057	0.058	0.066
ACW03	U-235	KH199-1643-05	0.000	0.000	0.000	0.046
ACW03	U-238	KH199-1643-05	0.055	0.055	0.057	0.037
ACW03	PU-239/240	KH199-1643-05	-0.004	0.045	0.045	0.117
ACW03	AM-241	KH199-1643-05	2.53	0.771	0.922	0.389

COPY

Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1B	SCAQC-1643-LD1B	SCAQC-1643-PBB
Pu	SCAQC-1643-LC1B	SCAQC-1643-LD1B	SCAQC-1643-PBB
Am	SCAQC-1643-LC1B	SCAQC-1643-LD1B	SCAQC-1643-PBB

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Radioanalytical Results

Quality Control Sample Evaluation

RE-COUNT #1

Report Identification Number: 99A8967

Project Name: Kaiser-Hill

Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (dpm)	(OV) Laboratory Control Sample Activity (dpm)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1643-LC1B	4.24 ∓ 0.117	3.56 ∓ 0.962	83.9	1.12
ACW03	PU-239/240	SCAQC-1643-LC1B	4.55 ∓ 0.100	5.03 ∓ 1.32	111	0.574
ACW03	U-233/234	SCAQC-1643-LC1B	8.02 ∓ 0.321	8.77 ∓ 2.10	109	0.533
ACW03	U-238	SCAQC-1643-LC1B	8.02 ∓ 0.321	9.49 ∓ 2.26	118	0.970

Laboratory Duplicate Sample (LD1) Evaluation

COPY

Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1643-LD1B	0.326 ∓ 0.166	0.317 ∓ 0.170	0.009	0.038
ACW03	U-235	SCAQC-1643-LD1B	0.012 ∓ 0.043	0.069 ∓ 0.083	0.057	0.613
ACW03	U-238	SCAQC-1643-LD1B	0.283 ∓ 0.151	0.308 ∓ 0.169	0.026	0.113
ACW03	PU-239/240	SCAQC-1643-LD1B	0.033 ∓ 0.047	0.020 ∓ 0.039	0.013	0.218
ACW03	AM-241	SCAQC-1643-LD1B	-0.012 ∓ 0.024	-0.011 ∓ 0.023	0.001	0.015

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Southeastern Environmental Laboratory

Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

RE-COUNT #1

Report Identification Number: 99A8967

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: N/A		
Other Sample ID: PB	Collection Date: 7/27/99	Date Received: 7/27/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1643-PBB	0.016	0.033	0.033	0.044
ACW03	U-235	SCAQC-1643-PBB	0.040	0.057	0.059	0.055
ACW03	U-238	SCAQC-1643-PBB	0.065	0.066	0.067	0.044
ACW03	PU-239/240	SCAQC-1643-PBB	0.000	0.000	0.000	0.053
ACW03	AM-241	SCAQC-1643-PBB	0.000	0.000	0.000	0.051

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Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1B	SCAQC-1643-LD1B	SCAQC-1643-PBB
Pu	SCAQC-1643-LC1B	SCAQC-1643-LD1B	SCAQC-1643-PBB
Am	SCAQC-1643-LC1B	SCAQC-1643-LD1B	SCAQC-1643-PBB

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Southeastern Environmental Laboratory

Radioanalytical Results

RE-COUNT #2

Report Identification Number: 99A8967

Project Name: Kaiser-Hill	Chain-of-Custody Number: 99A8967#002		Matrix: Waste
Site Sample ID: 006.002			
Other Sample ID: T112 B NW CORNER	Collection Date: 7/21/99	Date Received:	7/27/99
	Batch Number: 1643	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1643-06	0.063	0.072	0.073	0.084
ACW03	U-235	KH199-1643-06	0.065	0.075	0.078	0.059
ACW03	U-238	KH199-1643-06	0.063	0.072	0.073	0.084
ACW03	PU-239/240	KH199-1643-06	0.015	0.059	0.059	0.118
ACW03	AM-241	KH199-1643-06	1.80	0.598	0.696	0.106

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Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1C	SCAQC-1643-LD1C	SCAQC-1643-PBC
Pu	SCAQC-1643-LC1C	SCAQC-1643-LD1C	SCAQC-1643-PBC
Am	SCAQC-1643-LC1C	SCAQC-1643-LD1C	SCAQC-1643-PBC

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Radioanalytical Results

RE-COUNT#

Quality Control Sample Evaluation

Report Identification Number: 99A8967

Project Name: Kaiser-Hill

Laboratory Code: SCA

Laboratory Contol Sample (LC1) Evaluation

Method Number	Radionuclide	Laboratory Sample ID	(CV) Decay Corrected Activity of Spike Added (dpm)	(OV) Laboratory Control Sample Activity (dpm)	Laboratory Control Sample % Recovery (Accuracy)	Number of σ Between CV and OV
ACW03	AM-241	SCAQC-1643-LC1C	4.24 ∓ 0.117	4.39 ∓ 1.18	104	0.204
ACW03	PU-239/240	SCAQC-1643-LC1C	4.55 ∓ 0.100	4.43 ∓ 1.18	97.3	0.165
ACW03	U-233/234	SCAQC-1643-LC1C	8.02 ∓ 0.321	9.10 ∓ 2.15	113	0.746
ACW03	U-238	SCAQC-1643-LC1C	8.02 ∓ 0.321	9.15 ∓ 2.16	114	0.773

Laboratory Duplicate Sample (LD1) Evaluation

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Method Number	Radionuclide	Laboratory Sample ID	Original Sample Activity (pCi/g)	Duplicate Sample Activity (pCi/g)	Difference Between Original Activity and Duplicate Sample Activity (F)	Ratio of the Difference Between the Sample Activities and the Propagated Measurement Original Activity and Uncertainty of the Difference at 2 σ (F/E)
ACW03	U-233/234	SCAQC-1643-LD1C	0.263 ∓ 0.131	0.136 ∓ 0.101	0.127	0.769
ACW03	U-235	SCAQC-1643-LD1C	0.049 ∓ 0.058	0.063 ∓ 0.075	0.014	0.149
ACW03	U-238	SCAQC-1643-LD1C	0.225 ∓ 0.123	0.254 ∓ 0.143	0.029	0.152
ACW03	PU-239/240	SCAQC-1643-LD1C	0.033 ∓ 0.047	0.009 ∓ 0.034	0.023	0.404
ACW03	AM-241	SCAQC-1643-LD1C	-0.066 ∓ 0.127	-0.048 ∓ 0.091	0.019	0.118

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Radioanalytical Results

Quality Control Sample
Preparation Blank (PB)

RE-COUNT #2

Report Identification Number: 99A8967

Project Name: Kaiser-Hill	Chain-of-Custody Number: None	Matrix: Water
Site Sample ID: N/A		
Other Sample ID: PB	Collection Date: 7/27/99	Date Received: 7/27/99
		Laboratory Code: SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (dpm)	2 σ Counting Error (dpm)	Total Error (dpm)	MDA (dpm)
ACW03	U-233/234	SCAQC-1643-PBC	0.003	0.038	0.038	0.093
ACW03	U-235	SCAQC-1643-PBC	0.020	0.041	0.041	0.055
ACW03	U-238	SCAQC-1643-PBC	0.062	0.074	0.076	0.044
ACW03	PU-239/240	SCAQC-1643-PBC	0.004	0.045	0.045	0.111
ACW03	AM-241	SCAQC-1643-PBC	0.000	0.096	0.096	0.179

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Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1C	SCAQC-1643-LD1C	SCAQC-1643-PBC
Pu	SCAQC-1643-LC1C	SCAQC-1643-LD1C	SCAQC-1643-PBC
Am	SCAQC-1643-LC1C	SCAQC-1643-LD1C	SCAQC-1643-PBC

Sanford Cohen & Associates
Southeastern Environmental Laboratory

Radioanalytical Results REANALYSIS #1

Report Identification Number: 99A8967

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	99A8967#002	Matrix:	Waste
Site Sample ID:	007-002				
Other Sample ID:	T112 B NW CORNER	Collection Date:	7/21/99	Date Received:	7/27/99
		Batch Number:	1643	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1643-07	0.173	0.132	0.136	0.067
ACW03	U-235	KH199-1643-07	0.000	0.000	0.000	0.082
ACW03	U-238	KH199-1643-07	0.088	0.100	0.102	0.118
ACW03	PU-239/240	KH199-1643-07	0.000	0.000	0.000	0.094
ACW03	AM-241	KH199-1643-07	0.000	0.000	0.000	0.272

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Quality Control Samples

Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Pu	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Am	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB

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Radioanalytical Results

REANALYSIS #2

Report Identification Number: 99A8967

Project Name:	Kaiser-Hill	Chain-of-Custody Number:	99A8967#002	Matrix:	Waste
Site Sample ID:	008-002				
Other Sample ID:	T112 B NW CORNER	Collection Date:	7/21/99	Date Received:	7/27/99
		Batch Number:	1643	Laboratory Code:	SCA

Method Number	Radionuclide	Laboratory Sample ID	Activity (pCi/g)	2 σ Counting Error (pCi/g)	Total Error (pCi/g)	MDA (pCi/g)
ACW03	U-233/234	KH199-1643-08	0.288	0.182	0.191	0.145
ACW03	U-235	KH199-1643-08	-0.013	0.025	0.026	0.152
ACW03	U-238	KH199-1643-08	0.118	0.117	0.119	0.122
ACW03	PU-239/240	KH199-1643-08	0.033	0.066	0.066	0.089
ACW03	AM-241	KH199-1643-08	0.036	0.073	0.073	0.098

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Quality Control Samples			
Radionuclide	Laboratory Control Sample (LC)	Laboratory Duplicate Analysis (LD)	Preparation Blank (PB)
U	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Pu	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB
Am	SCAQC-1643-LC1	SCAQC-1643-LD1	SCAQC-1643-PB

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CASE NARRATIVE
RIN 99A8967
Laboratory Report Identification Number: 1643
PSA Module RC01B.3

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September 7, 1999

I. Introduction

On July 27, 1999, four waste samples, (RIN 99A8967), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The chain-of-custody accompanying the samples requested they be analyzed on a "rush" basis. The samples were analyzed in accordance with Kaiser-Hill specifications stated in the "Statement of Work for Analytical Measurements, Isotopic Determinations by Alpha Spectrometry, Module RCO1-B.3", dated April 24, 1998, and Modification 09, dated July 16, 1998.

II. Analytical Methodology

The radioanalytical results reported for each sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. All samples were analyzed by an Eichrom Industries, Inc. extraction chromatography method (ACW03) for isotopic uranium, plutonium, and americium.

Sample KH199-1643-03 was requested to be recounted and reanalyzed. This sample consisted of approximately 100 strips of aluminum material. We were instructed to obtain and subject an aliquot of the sample to total digestion (See correspondence). Because only a small amount of this material can be totally digested for this method of analysis, 0.25 and 0.5 grams were randomly obtained for analysis.

Because a relatively small aliquot of the entire sample was taken for analysis we cannot ensure that the results are representative of the entire sample or that they can be duplicated by additional analysis.

III. Analytical Results

Deficiencies

See Reanalysis.

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Matrix Interferences

There were no indications of matrix interference.

Dilutions

No dilutions were required.

Detection Limits

The required detection limits (RDL) were met for all sample analyses.

Reanalysis

The Am-243 tracer recovery in samples KH199-1643-03, KH199-1643-04 was less than the 20% specified in the SOW. The samples were reanalyzed beginning with sample preparation and the results were acceptable. The Original and Reanalysis Sample I.D. are listed below.

Original Laboratory Sample I.D.	Reanalysis Laboratory Sample I.D.	Analysis Type
KH199-1643-03	KH199-1643-03B	Am-241
KH199-1643-04	KH199-1643-03B	Am-241

The Contract Technical Representative (CTR) requested that sample KH199-1643-03, (99A8967-003.002) and all associated Quality Control Samples be recounted twice. The first recount of the sample was to be designated Bottle Number 99A8967-005.002, (KH199-1643-05), and the second recount designated Bottle Number 99A8967-006.002, (KH199-1643-06). The Original and Recount Sample ID are listed below.

Recount #1

Original Laboratory Sample I.D.	First ReCount Laboratory Sample I.D.	Analysis Type
KH199-1643-03 (U, Pu) KH199-1643-03B (Am)	KH199-1643-05 (U, Pu, Am)	U, Pu, Am
SCAQC-1643-PB	SCAQC-1643-PBB	U, Pu, Am
SCAQC-1643-LC1	SCAQC-1643-LC1B	U, Pu, Am
SCAQC-1643-LD1	SCAQC-1643-LD1B	U, Pu, Am
KH199-1643-01	KH199-1643-01B	U, Pu, Am

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Recount #2

Original Laboratory Sample I.D.	Second ReCount Laboratory Sample I.D.	Analysis Type
KH199-1643-03 (U, Pu) KH199-1643-03B (Am)	KH199-1643-06 (U, Pu, Am)	U, Pu, Am
SCAQC-1643-PB	SCAQC-1643-PBC	U, Pu, Am
SCAQC-1643-LC1	SCAQC-1643-LC1C	U, Pu, Am
SCAQC-1643-LD1	SCAQC-1643-LD1C	U, Pu, Am
KH199-1643-01	KH199-1643-01C	U, Pu, Am

The results of the recounted samples were reported on August 16, 1999. The CTR requested that two reanalysis of sample KH199-1643-03 be performed. For the first reanalysis sample KH199-1643-03, (99A8967-003.002) was to be designated Bottle Number 99A8967-007.002, (KH199-1643-07), and the second reanalysis designated Bottle Number 99A8967-008.002, (KH199-1643-08). The Original and Reanalysis Sample ID are listed below.

Reanalysis

Original Laboratory Sample I.D.	Reanalysis Laboratory Sample I.D.	Analysis Type
KH199-1643-03 (U, Pu) KH199-1643-03B (Am)	KH199-1643-07 (U, Pu, Am)	U, Pu, Am
KH199-1643-03 (U, Pu) KH199-1643-03B (Am)	KH199-1643-08 (U, Pu, Am)	U, Pu, Am

Deviations from Protocols

There were no deviations from the written protocols and analytical methods. (See comments under Analytical Methodology relative to sample leaching vs digestion.)

Contacts with the CTR

The contract technical representative (CTR) requested that sample KH199-1643-03 and all associated Quality Control Samples be recounted. The CTR requested the sample be reassigned a Bottle Number of 99A8967-005.002 and 99A8967-006.002, respectively, for the recounts.

The contract technical representative (CTR) requested that sample KH199-1643-03 be reanalyzed. The CTR requested the sample be reassigned a Bottle Number of 99A8967-007.002 and 99A8967-008.002, respectively, for the reanalysis.

IV. Quality Control

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Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-1643-LC1	Laboratory Control Sample
99A8967-001.002 T112 A Center	SCAQC-1643-LD1	Laboratory Duplicate Sample
Laboratory Type II Water	SCAQC-1643-PB	Preparation Blank

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,

Joe Stinson
Laboratory Manager

9/7/99
Date

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Comm[redacted] Advanced Sciences, Inc.

CHAIN OF CUSTO[redacted]Y/SAMPLE ANALYSIS REQUEST

C.O.C. # [redacted] 99[redacted]8967#002

Page 1 of 1

Collector C E Angell [redacted] D. Zigich [redacted]	Contact/Requester WOJTASCEK	Telephone No. 3125 MSIN N/A FAX
RIN 99A8967	Sampling Origin T-112	Purchase Order/Charge Code 02017100
Project Title N/A	Logbook No. 94 Van	Ice Chest No. N/A Temp. [redacted]
To (Lab) S. Cohen & Associates	Method of Shipment Fed. Ex	Bill of Lading/Air Bill No. 4533 2124 9019
Protocol CAS-SOP. 003		Offsite Property No.

COPY

POSSIBLE SAMPLE HAZARDS/REMARKS possible Tar present in Sample
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐

KH199-1643-

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
99A8967-001.002	T112 A Center	SOLID	7-21-99	1200	T-112	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] 01	None 4 degrees C
99A8967-002.002	T112 A S.W. Corner	SOLID		1230	T-112	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] 02	None 4 degrees C
99A8967-003.002	T112B N.W. Corner	SOLID		1300	T-112	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] 03	None 4 degrees C
99A8967-004.002	T112B N.E. Corner	SOLID		1315	T-112	125-G P/G	RC01B003 (Isotopic (Soil)) [Rush] 04	None 4 degrees C

CEA 7-21-99

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
C E Angell	7-21-99 1500	Ref #2 T891R	7-21-99 1500	Ref #2 T891R	7/26/99 1555	J R Christman	7/26/99 1555
J R Christman	7/26/99 1555	Fed EX				S L Fisher ISCO	7/27/99

FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

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Trailer 112B Roof Media Sample Results

GRID LOCATION	SAMPLE MAP LOCATION	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (mm^2)	SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE ($dpm/100cm^2$)	ESTIMATED MDA ($dpm/100cm^2$)	URANIUM TOTAL $DCGL_W$=5000 (dpm/100cm2)	TRANSURANIC TOTAL $DCGL_W$=100 (dpm/100cm2)	Po-210 TOTAL DCGL=NA (dpm/100cm2)
M2	A	99A8967-003.002	U-233/234	0.030	0.076	1.95	645	1.0	2.0	5.1	4.4		
			U-235	0.000	0.045				0.0	3.0			
			U-238	0.035	0.064				2.3	4.3			
			Pu-239/240	0.022	0.059				1.5	4.0		160.5	
			Am-241	2.370	0.119				159.1	8.0			
			Po-210										
D1	B	99A8967-004.002	U-233/234	0.068	0.037	1.73	645	1.0	4.0	2.2	5.8		
			U-235	0.017	0.045				1.0	2.7			
			U-238	0.013	0.037				0.8	2.2			
			Pu-239/240	-0.010	0.117				-0.6	6.9		-0.6	
			Am-241	0.000	0.088				0.0	5.2			
			Po-210										
A2	1	00A1057-002.001	U-233/234	-0.005	0.047	5.97	2254	3.5	-0.3	2.8	-0.2		
			U-235	-0.005	0.047				-0.3	2.8			
			U-238	0.007	0.019				0.4	1.1			
			Pu-239/240	-0.004	0.030				-0.2	1.8		0.3	
			Am-241	0.009	0.013				0.5	0.7			
			Po-210	1.500	0.124				88.2	7.3			88.2
B2	2	00A1057-003.001	U-233/234	0.003	0.031	6.45	2450	3.8	0.2	1.8	1.3		
			U-235	0.005	0.014				0.3	0.8			
			U-238	0.015	0.026				0.8	1.5			
			Pu-239/240	0.006	0.025				0.4	1.5		1.1	
			Am-241	0.013	0.011				0.8	0.6			
			Po-210	2.100	0.019				122.7	1.1			122.7
D2	3	00A1057-004.001	U-233/234	0.017	0.039	6.75	2500	3.9	1.0	2.4	2.1		
			U-235	0.004	0.024				0.2	1.4			
			U-238	0.014	0.013				0.9	0.8			
			Pu-239/240	-0.002	0.023				-0.1	1.4		0.3	
			Am-241	0.006	0.015				0.4	0.9			
			Po-210	2.190	0.006				131.2	0.3			131.2
E2	4	00A1057-005.001	U-233/234	0.013	0.030	6.99	2625	4.1	0.7	1.7	2.5		
			U-235	0.010	0.014				0.6	0.8			
			U-238	0.020	0.014				1.2	0.8			
			Pu-239/240	0.003	0.015				0.2	0.9		0.6	
			Am-241	0.007	0.004				0.4	0.2			
			Po-210	2.250	0.016				133.0	0.9			133.0

Trailer 112B Roof Media Sample Results

GRID LOCATION	SAMPLE MAP LOCATION	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (mm^2)	SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE ($dpm/100cm^2$)	ESTIMATED MDA ($dpm/100cm^2$)	URANIUM TOTAL $DCGL_W$=5000 (dpm/100cm2)	TRANSURANIC TOTAL $DCGL_W$=100 (dpm/100cm2)	Po-210 TOTAL DCGL=NA (dpm/100cm2)
F2	5	00A1057-006.001	U-233/234	0.012	0.034	6.84	2600	4.0	0.7	2.0	2.0		
			U-235	0.012	0.034				0.7	2.0			
			U-238	0.010	0.014				0.6	0.8			
			Pu-239/240	0.002	0.026				0.1	1.5		0.5	
			Am-241	0.006	0.011				0.3	0.6			
			Po-210	2.120	0.006				123.8	0.3			123.8
G2	6	00A1057-007.001	U-233/234	0.015	0.042	6.33	2397	3.7	0.9	2.4	1.4		
			U-235	-0.003	0.032				-0.2	1.8			
			U-238	0.012	0.035				0.7	2.1			
			Pu-239/240	0.013	0.028				0.8	1.6		1.0	
			Am-241	0.004	0.011				0.3	0.6			
			Po-210	2.060	0.016				120.7	0.9			120.7
H1	7	00A1057-008.001	U-233/234	0.021	0.038	6.17	2209	3.4	1.3	2.3	1.8		
			U-235	0.002	0.031				0.2	1.9			
			U-238	0.005	0.014				0.3	0.9			
			Pu-239/240	0.002	0.021				0.1	1.3		0.8	
			Am-241	0.010	0.012				0.6	0.7			
			Po-210	2.140	0.027				132.7	1.6			132.7
J2	8	00A1057-009.001	U-233/234	0.008	0.042	6.67	2575	4.0	0.5	2.4	0.5		
			U-235	0.001	0.029				0.1	1.7			
			U-238	0.000	0.032				0.0	1.8			
			Pu-239/240	0.002	0.018				0.1	1.0		0.5	
			Am-241	0.006	0.004				0.4	0.2			
			Po-210	2.190	0.006				125.9	0.4			125.9
K1	9	00A1057-010.001	U-233/234	0.020	0.031	6.70	2500	3.9	1.2	1.8	1.9		
			U-235	0.011	0.031				0.6	1.8			
			U-238	0.001	0.036				0.1	2.1			
			Pu-239/240	0.002	0.018				0.1	1.1		0.4	
			Am-241	0.004	0.004				0.3	0.2			
			Po-210	2.560	0.016				152.2	0.9			152.2
L1	10	00A1057-011.001	U-233/234	0.046	0.037	6.49	2425	3.8	2.7	2.2	3.4		
			U-235	0.006	0.015				0.3	0.9			
			U-238	0.006	0.015				0.3	0.9			
			Pu-239/240	0.002	0.024				0.1	1.4		1.1	
			Am-241	0.017	0.016				1.0	0.9			
			Po-210	2.270	0.027				134.8	1.6			134.8

Trailer 112B Roof Media Sample Results

GRID LOCATION	SAMPLE MAP LOCATION	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (mm^2)	SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE ($dpm/100cm^2$)	ESTIMATED MDA ($dpm/100cm^2$)	URANIUM TOTAL $DCGL_W$=5000 (dpm/100cm2)	TRANSURANIC TOTAL $DCGL_W$=100 (dpm/100cm2)	Po-210 TOTAL DCGL=NA (dpm/100cm2)
M2	11	00A1057-012.001	U-233/234	0.016	0.034	7.73	2808	4.4	1.0	2.0	2.7		
			U-235	0.003	0.021				0.2	1.3			
			U-238	0.025	0.021				1.5	1.3			
			Pu-239/240	0.007	0.010				0.4	0.6		1.2	
			Am-241	0.012	0.004				0.7	0.2			
			Po-210	2.550	0.005				155.9	0.3			155.9
M2	11 (field dup.)	00A1057-013.001	U-233/234	0.007	0.032	7.69	2842	4.4	0.4	1.9	0.6		
			U-235	-0.005	0.004				-0.3	0.3			
			U-238	0.008	0.011				0.5	0.7			
			Pu-239/240	0.003	0.017				0.2	1.0		0.5	
			Am-241	0.005	0.004				0.3	0.2			
			Po-210	2.350	0.005				141.2	0.3			141.2
M2	12	00A1057-014.001	U-233/234	0.018	0.037	6.38	2322	3.6	1.1	2.3	1.6		
			U-235	-0.001	0.024				-0.1	1.4			
			U-238	0.010	0.035				0.6	2.1			
			Pu-239/240	0.003	0.017				0.2	1.0		0.5	
			Am-241	0.005	0.004				0.3	0.2			
			Po-210	2.540	0.006				154.8	0.4			154.8
M2	13	00A1057-015.001	U-233/234	0.013	0.012	6.88	2550	4.0	0.8	0.7	0.9		
			U-235	-0.001	0.022				-0.1	1.3			
			U-238	0.002	0.009				0.1	0.5			
			Pu-239/240	0.009	0.013				0.5	0.8		0.3	
			Am-241	-0.004	0.017				-0.2	1.0			
			Po-210	2.090	0.025				125.3	1.5			125.3
M2	14	00A1057-016.001	U-233/234	0.009	0.033	6.39	2425	3.8	0.5	1.9	0.6		
			U-235	-0.001	0.023				-0.1	1.3			
			U-238	0.001	0.040				0.1	2.3			
			Pu-239/240	0.004	0.017				0.2	1.0		0.9	
			Am-241	0.012	0.004				0.7	0.2			
			Po-210	1.650	0.006				96.5	0.3			96.5
M2	A, 11-14	Average	U-233/234	0.016	0.037	6.17	2265	3.5	0.9	2.3	1.7		
			U-235	-0.001	0.023				-0.1	1.4			
			U-238	0.014	0.030				0.8	1.8			
			Pu-239/240	0.008	0.022				0.5	1.3		24.7	
			Am-241	0.400	0.025				24.2	1.5			
			Po-210	2.236	0.009				135.2	0.6			135.2

Trailer 112B Roof Media Sample Results

GRID LOCATION	SAMPLE MAP LOCATION	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (mm^2)	SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE ($dpm/100cm^2$)	ESTIMATED MDA ($dpm/100cm^2$)	URANIUM TOTAL $DCGL_W$=5000 (dpm/100cm2)	TRANSURANIC TOTAL $DCGL_W$=100 (dpm/100cm2)	Po-210 TOTAL DCGL=NA (dpm/100cm2)
M3	15	00A1057-017.001	U-233/234	0.009	0.033	6.90	2619	4.1	0.5	1.9	**0.6**		
			U-235	-0.001	0.023				-0.1	1.3			
			U-238	0.001	0.040				0.1	2.3			
			Pu-239/240	0.002	0.015				0.1	0.9		**0.5**	
			Am-241	0.007	0.016				0.4	0.9			
			Po-210	2.220	0.023				129.7	1.3			**129.7**
G3	16	00A1057-018.001	U-233/234	0.012	0.028	6.74	2600	4.0	0.7	1.6	**1.7**		
			U-235	-0.001	0.024				-0.1	1.4			
			U-238	0.018	0.024				1.0	1.4			
			Pu-239/240	0.002	0.016				0.1	0.9		**0.6**	
			Am-241	0.008	0.010				0.5	0.6			
			Po-210	2.060	0.006				118.5	0.4			**118.5**
D3	17	00A1057-019.001	U-233/234	0.035	0.045	6.99	2652	4.1	2.1	2.6	**2.9**		
			U-235	0.008	0.045				0.5	2.6			
			U-238	0.006	0.039				0.3	2.3			
			Pu-239/240	0.000	0.020				0.0	1.2		**0.3**	
			Am-241	0.005	0.004				0.3	0.3			
			Po-210	2.350	0.014				137.5	0.8			**137.5**
A3	18	00A1057-020.001	U-233/234	0.004	0.026	6.23	2250	3.5	0.2	1.6	**0.0**		
			U-235	-0.003	0.032				-0.2	1.9			
			U-238	-0.001	0.026				-0.1	1.6			
			Pu-239/240	-0.002	0.018				-0.1	1.1		**3.8**	
			Am-241	0.063	0.022				3.9	1.3			
			Po-210	1.430	0.006				87.8	0.4			**87.8**

MIN	**-0.2**	**-0.6**	**87.8**
MAX	**5.8**	**160.5**	**155.9**
MEAN	**1.8**	**9.1**	**127.4**
SD	**1.4**	**34.2**	**19.0**
$DCGL_W$ =	**5000**	**100**	**NA**

Sample QC Results Summary
3/14/00

Batch # : 10867
RIN 00A1057
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1057-002.001	20987001	Plutonium-239/240	-3.98E-03	1.35E-02	2.99E-02	0.30	69.18
00A1057-003.001	20987002	Plutonium-239/240	6.25E-03	1.35E-02	2.51E-02	0.30	62.40
00A1057-004.001	20987003	Plutonium-239/240	-2.13E-03	9.34E-03	2.30E-02	0.30	61.80
00A1057-005.001	20987004	Plutonium-239/240	3.15E-03	7.56E-03	1.46E-02	0.30	70.44
00A1057-006.001	20987005	Plutonium-239/240	2.18E-03	1.28E-02	2.63E-02	0.30	55.17
00A1057-007.001	20987006	Plutonium-239/240	1.28E-02	1.66E-02	2.79E-02	0.30	65.92
00A1057-008.001	20987007	Plutonium-239/240	2.25E-03	9.85E-03	2.09E-02	0.30	61.39
00A1057-009.001	20987008	Plutonium-239/240	1.90E-03	8.33E-03	1.77E-02	0.30	71.39
00A1057-010.001	20987009	Plutonium-239/240	1.66E-03	8.60E-03	1.79E-02	0.30	67.76
00A1057-011.001	20987010	Plutonium-239/240	1.96E-03	1.15E-02	2.35E-02	0.30	58.33
00A1057-012.001	20987011	Plutonium-239/240	6.97E-03	7.23E-03	1.03E-02	0.30	69.08
00A1057-013.001	20987012	Plutonium-239/240	3.16E-03	8.76E-03	1.70E-02	0.30	70.08
00A1057-014.001	20987013	Plutonium-239/240	3.09E-03	8.57E-03	1.67E-02	0.30	72.44
00A1057-015.001	20987014	Plutonium-239/240	8.60E-03	8.92E-03	1.27E-02	0.30	65.49
00A1057-016.001	20987015	Plutonium-239/240	3.58E-03	8.58E-03	1.66E-02	0.30	67.47
00A1057-017.001	20987016	Plutonium-239/240	1.59E-03	6.98E-03	1.48E-02	0.30	69.46
00A1057-018.001	20987017	Plutonium-239/240	1.71E-03	7.50E-03	1.59E-02	0.30	68.46
00A1057-019.001	20987018	Plutonium-239/240	0.00E+00	8.95E-03	2.01E-02	0.30	57.40
00A1057-020.001	20987019	Plutonium-239/240	-1.92E-03	6.50E-03	1.78E-02	0.30	58.57
00A1057-021.001	20987020	Plutonium-239/240	-3.24E-05	1.00E-04	2.29E-04	0.30	85.63
1000023013	Blank	Plutonium-239/240	0.00E+00	7.34E-03	1.65E-02	0.30	91.28

Sample QC Results Summary
3/14/00

1000023014	Duplicate 00A1057-003.001	Plutonium-239/240	9.12E-03	1.07E-02	1.70E-02	0.30	60.37
1000023015	LCS	Plutonium-239/240	2.22E+00	1.17E-01	1.49E-02	0.30	82.89

LCS recovery:

	Nom. Conc.	Recovery:
Pu-239/240	2.23	100%

Equivalency:
Pu-239/240 F/E = 0.1666

Sample QC Results Summary
3/14/00

Batch # : 10864
RIN 00A1057
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1057-002.001	20987001	Americium-241	8.59E-03	8.90E-03	1.26E-02	0.30	81.58
00A1057-003.001	20987002	Americium-241	1.31E-02	9.44E-03	1.07E-02	0.30	80.88
00A1057-004.001	20987003	Americium-241	6.42E-03	9.06E-03	1.54E-02	0.30	89.69
00A1057-005.001	20987004	Americium-241	6.71E-03	5.88E-03	3.63E-03	0.30	96.28
00A1057-006.001	20987005	Americium-241	5.80E-03	6.95E-03	1.07E-02	0.30	85.11
00A1057-007.001	20987006	Americium-241	4.41E-03	6.44E-03	1.08E-02	0.30	86.80
00A1057-008.001	20987007	Americium-241	1.04E-02	9.57E-03	1.27E-02	0.30	80.91
00A1057-009.001	20987008	Americium-241	6.23E-03	6.10E-03	4.22E-03	0.30	81.00
00A1057-010.001	20987009	Americium-241	4.33E-03	4.89E-03	3.91E-03	0.30	89.26
00A1057-011.001	20987010	Americium-241	1.69E-02	1.24E-02	1.57E-02	0.30	86.19
00A1057-012.001	20987011	Americium-241	1.22E-02	7.93E-03	3.66E-03	0.30	86.05
00A1057-013.001	20987012	Americium-241	5.18E-03	5.08E-03	3.51E-03	0.30	83.26
00A1057-014.001	20987013	Americium-241	5.49E-03	5.38E-03	3.72E-03	0.30	88.52
00A1057-015.001	20987014	Americium-241	-3.60E-03	4.99E-03	1.67E-02	0.30	76.25
00A1057-016.001	20987015	Americium-241	1.18E-02	8.18E-03	4.00E-03	0.30	85.18
00A1057-017.001	20987016	Americium-241	6.67E-03	9.43E-03	1.60E-02	0.30	79.50
00A1057-018.001	20987017	Americium-241	8.05E-03	7.43E-03	9.88E-03	0.30	90.56
00A1057-019.001	20987018	Americium-241	4.81E-03	5.44E-03	4.34E-03	0.30	77.87
00A1057-020.001	20987019	Americium-241	6.33E-02	2.12E-02	2.18E-02	0.30	83.15
00A1057-021.001	20987020	Americium-241	2.22E-04	1.56E-04	2.23E-04	0.30	91.40
1000023002	Blank	Americium-241	3.44E-03	9.54E-03	1.85E-02	0.30	85.91

Sample QC Results Summary
3/14/00

1000023003	Duplicate	Americium-241	1.16E-02	9.24E-03	5.21E-03	0.30	72.36
1000023004	LCS	Americium-241	2.18E+00	1.22E-01	3.88E-02	0.30	88.69

LCS recovery:

	Nom. Conc.	Recovery:
Am-241	2.1	104%

Equivalency:
Am-241 F/E = 0.114

Rocky Flats

Sample QC Results Summary
3/14/00

Batch # : 10873
RIN 00A1057
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1057-002.001	20987001	Uranium-233/234	-5.09E-03	5.76E-03	4.71E-02	1.00	84.28
		Uranium-235	-5.11E-03	5.76E-03	4.71E-02	1.00	84.28
		Uranium-238	7.07E-03	1.39E-02	1.92E-02	1.00	84.28
00A1057-003.001	20987002	Uranium-233/234	2.73E-03	1.09E-02	3.12E-02	1.00	95.30
		Uranium-235	5.27E-03	1.03E-02	1.42E-02	1.00	95.30
		Uranium-238	1.45E-02	1.80E-02	2.62E-02	1.00	95.30
00A1057-004.001	20987003	Uranium-233/234	1.69E-02	2.15E-02	3.94E-02	1.00	96.18
		Uranium-235	3.62E-03	9.57E-03	2.37E-02	1.00	96.18
		Uranium-238	1.42E-02	1.61E-02	1.29E-02	1.00	96.18
00A1057-005.001	20987004	Uranium-233/234	1.25E-02	1.72E-02	2.95E-02	1.00	91.44
		Uranium-235	9.98E-03	1.38E-02	1.35E-02	1.00	91.44
		Uranium-238	1.99E-02	1.95E-02	1.35E-02	1.00	91.44
00A1057-006.001	20987005	Uranium-233/234	1.17E-02	1.79E-02	3.41E-02	1.00	93.99
		Uranium-235	1.17E-02	1.79E-02	3.41E-02	1.00	93.99
		Uranium-238	1.02E-02	1.42E-02	1.39E-02	1.00	93.99
00A1057-007.001	20987006	Uranium-233/234	1.49E-02	2.15E-02	4.15E-02	1.00	92.76
		Uranium-235	-2.56E-03	3.53E-03	3.15E-02	1.00	92.76
		Uranium-238	1.21E-02	1.85E-02	3.54E-02	1.00	92.76
00A1057-008.001	20987007	Uranium-233/234	2.09E-02	2.32E-02	3.77E-02	1.00	91.49
		Uranium-235	-2.49E-03	3.45E-03	3.08E-02	1.00	91.49
		Uranium-238	5.18E-03	1.02E-02	1.40E-02	1.00	91.49
00A1057-009.001	20987008	Uranium-233/234	8.06E-03	1.83E-02	4.19E-02	1.00	98.78
		Uranium-235	1.23E-03	9.30E-03	2.92E-02	1.00	98.78
		Uranium-238	1.75E-04	9.53E-03	3.19E-02	1.00	98.78
00A1057-010.001	20987009	Uranium-233/234	1.97E-02	2.06E-02	3.07E-02	1.00	94.05
		Uranium-235	1.06E-02	1.61E-02	3.07E-02	1.00	94.05
		Uranium-238	-9.23E-04	1.03E-02	3.61E-02	1.00	94.05
00A1057-011.001	20987010	Uranium-233/234	4.57E-02	3.28E-02	3.68E-02	1.00	94.17
		Uranium-235	5.54E-03	1.08E-02	1.50E-02	1.00	94.17
		Uranium-238	5.52E-03	1.08E-02	1.50E-02	1.00	94.17
00A1057-012.001	20987011	Uranium-233/234	1.63E-02	1.93E-02	3.35E-02	1.00	83.58
		Uranium-235	3.27E-03	8.65E-03	2.14E-02	1.00	83.58

Sample QC Results Summary
3/14/00

		Uranium-238	2.47E-02	2.07E-02	2.14E-02	1.00	83.58
00A1057-013.001	20987012	Uranium-233/234	7.42E-03	1.47E-02	3.22E-02	1.00	93.83
		Uranium-235	-4.96E-03	4.34E-03	3.22E-02	1.00	93.83
		Uranium-238	8.25E-03	1.14E-02	1.12E-02	1.00	93.83
00A1057-014.001	20987013	Uranium-233/234	1.81E-02	2.14E-02	3.72E-02	1.00	99.25
		Uranium-235	-1.14E-03	2.24E-03	2.37E-02	1.00	99.25
		Uranium-238	9.70E-03	1.68E-02	3.46E-02	1.00	99.25
00A1057-015.001	20987014	Uranium-233/234	1.30E-02	1.47E-02	1.17E-02	1.00	104.48
		Uranium-235	-1.04E-03	2.04E-03	2.16E-02	1.00	104.48
		Uranium-238	2.25E-03	8.97E-03	2.57E-02	1.00	104.48
00A1057-016.001	20987015	Uranium-233/234	2.69E-02	2.48E-02	3.40E-02	1.00	88.46
		Uranium-235	5.11E-03	9.99E-03	1.38E-02	1.00	88.46
		Uranium-238	1.41E-02	1.75E-02	2.54E-02	1.00	88.46
00A1057-017.001	20987016	Uranium-233/234	9.31E-03	1.61E-02	3.32E-02	1.00	96.74
		Uranium-235	-1.10E-03	2.15E-03	2.28E-02	1.00	96.74
		Uranium-238	1.46E-03	1.39E-02	3.99E-02	1.00	96.74
00A1057-018.001	20987017	Uranium-233/234	1.20E-02	1.65E-02	2.84E-02	1.00	87.59
		Uranium-235	-1.15E-03	2.25E-03	2.38E-02	1.00	87.59
		Uranium-238	1.80E-02	1.89E-02	2.38E-02	1.00	87.59
00A1057-019.001	20987018	Uranium-233/234	3.53E-02	3.04E-02	4.46E-02	1.00	78.94
		Uranium-235	8.41E-03	1.93E-02	4.46E-02	1.00	78.94
		Uranium-238	5.59E-03	1.57E-02	3.91E-02	1.00	78.94
00A1057-020.001	20987019	Uranium-233/234	4.03E-03	1.07E-02	2.64E-02	1.00	89.22
		Uranium-235	-2.55E-03	3.52E-03	3.15E-02	1.00	89.22
		Uranium-238	-1.27E-03	2.49E-03	2.64E-02	1.00	89.22
00A1057-021.001	20987020	Uranium-233/234	-4.37E-05	6.05E-05	5.40E-04	1.00	66.37
		Uranium-235	-1.83E-05	2.02E-04	7.11E-04	1.00	66.37
		Uranium-238	4.73E-05	1.88E-04	5.40E-04	1.00	66.37
1000023036	Blank	Uranium-233/234	-4.27E-03	2.21E-02	8.06E-02	1.00	66.26
		Uranium-235	-7.01E-03	7.91E-03	6.47E-02	1.00	66.26
		Uranium-238	-6.99E-03	7.91E-03	6.47E-02	1.00	66.26
1000023037	Duplicate	Uranium-233/234	1.35E-02	1.85E-02	3.18E-02	1.00	90.19
		Uranium-235	-2.58E-03	3.57E-03	3.18E-02	1.00	90.19
		Uranium-238	6.86E-03	1.55E-02	3.57E-02	1.00	90.19
1000023038	LCS	Uranium-233/234	1.99E+00	2.54E-01	4.20E-02	1.00	74.89
		Uranium-235	1.12E-01	6.20E-02	5.60E-02	1.00	74.89
		Uranium-238	2.20E+00	2.67E-01	5.60E-02	1.00	74.89

Sample QC Results Summary
3/14/00

LCS recovery:

	Nom. Conc.	Recovery:
U-238	2.25	98%

Equivalency:

U-233/234	F/E = 0.502
U-235	F/E = 0.72
U-238	F/E = 0.322

Sample QC Results Summary
3/10/00

Batch # : 10841
RIN 00A1057
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1057-002.001	20987001	Polonium-210	1.50E+00	1.24E-01	7.20E-03	0.30	56.52
00A1057-003.001	20987002	Polonium-210	2.10E+00	1.29E-01	1.91E-02	0.30	64.17
00A1057-004.001	20987003	Polonium-210	2.19E+00	1.31E-01	5.53E-03	0.30	62.60
00A1057-005.001	20987004	Polonium-210	2.25E+00	1.35E-01	1.56E-02	0.30	62.73
00A1057-006.001	20987005	Polonium-210	2.12E+00	1.32E-01	5.80E-03	0.30	60.26
00A1057-007.001	20987006	Polonium-210	2.06E+00	1.31E-01	1.61E-02	0.30	60.68
00A1057-008.001	20987007	Polonium-210	2.14E+00	1.35E-01	2.66E-02	0.30	57.00
00A1057-009.001	20987008	Polonium-210	2.19E+00	1.40E-01	6.29E-03	0.30	53.97
00A1057-010.001	20987009	Polonium-210	2.56E+00	1.46E-01	1.58E-02	0.30	54.84
00A1057-011.001	20987010	Polonium-210	2.27E+00	1.41E-01	2.71E-02	0.30	60.43
00A1057-012.001	20987011	Polonium-210	2.55E+00	1.28E-01	4.52E-03	0.30	63.92
00A1057-013.001	20987012	Polonium-210	2.35E+00	1.30E-01	5.10E-03	0.30	59.75
00A1057-014.001	20987013	Polonium-210	2.54E+00	1.44E-01	5.75E-03	0.30	62.63
00A1057-015.001	20987014	Polonium-210	2.09E+00	1.11E-01	2.53E-02	0.30	67.38
00A1057-016.001	20987015	Polonium-210	1.65E+00	1.14E-01	5.56E-03	0.30	57.58
00A1057-017.001	20987016	Polonium-210	2.22E+00	1.34E-01	2.26E-02	0.30	60.49
00A1057-018.001	20987017	Polonium-210	2.06E+00	1.34E-01	6.11E-03	0.30	59.62
00A1057-019.001	20987018	Polonium-210	2.35E+00	1.38E-01	1.97E-02	0.30	58.37
00A1057-020.001	20987019	Polonium-210	1.43E+00	1.09E-01	5.89E-03	0.30	58.44
00A1057-021.001	20987020	Polonium-210	7.76E-05	5.07E-05	6.02E-05	0.30	45.86
1000022919	Blank	Polonium-210	1.58E-02	2.24E-02	3.81E-02	0.30	48.35

Sample QC Results Summary
3/10/00

1000022920	Duplicate 00A1057-002.001	Polonium-210	1.54E+00	1.16E-01	2.10E-02	0.30	56.51
1000022921	LCS	Polonium-210	1.30E+01	3.77E-01	3.73E-02	0.30	55.89

LCS recovery:

	Nom. Conc.	Recovery:
Po-210	17.1	76%

Equivalency:
Po-210 F/E = 0.247

00A1057
Data Package Narrative

Twenty water samples, under the Subcontract Number KH700331EP6, were received on January 25, 2000. Twenty samples were analyzed by Alpha Spectroscopy for Polonium-210, Plutonium 239/240, Americium 241, and Uranium 233/234, 235, 238.

- Analytical Method: EPI A-011 (Alpha Spec)
- Matrix Interferences: There are no matrix interferences to report.
- QC Deficiencies: There were no deficiencies.
- Hold Times: All samples were analyzed within the required holding time.
- RDLs: There were no failed detection limits.
- Reanalysis Information: There were no reanalysis of the samples.
- Deviations from SOP: See following page.

Comments:

1. RC01CAL_EPI_1-FEB-2000, RC01CAL_EPI_2-FEB-2000, RC01CAL_EPI_4-FEB-2000, RC01CAL_EPI_15-FEB-2000 and RC01CAL_EPI_17-FEB-2000 correspond to RC01CAL_EPI_01FEB2000. RC01CAL_EPI_1-MAR-2000, RC01CAL_EPI_2-MAR-2000, RC01CAL_EPI_3-MAR-2000 and RC01CAL_EPI_4-MAR-2000 correspond to RC01CAL_EPI_01MAR2000.

2. The following samples did not meet the FWHM requirement of < 80 keV.

00A1057-009.001_UU	99 keV
00A1057-011.001_UU	84 keV
1000023037_UU	85 keV
1000023038_UU	95 keV

3. Sample 00A1057-014.001_PO did not meet the peak centroid requirement.

4. NCR# GEL-AS-RC-1830: The Po-209 tracer used for analysis of these samples was expired.

Method deviations for KHCO Metal Flashing Samples

Due to the unusual sample matrix of KHCO samples for RIN 00A1057 the samples were analyzed using alternate chemistry techniques not covered in the routine Standard Operating Procedures for isotopic polonium, americium, plutonium, and uranium. The sample matrix for the specified RIN was rectangular portions of metal "flashing." Deviations from routine procedures for this RIN are as follows:

The mass of each total sample which was analyzed was measured and recorded. Each sample was divided approximately in half and the dimensions and mass of each half was measured and recorded. Half of each sample was placed in a beaker for analysis and the other half was placed back in the original sample container.

Appropriate tracers were added to each sample. The samples were dissolved using combinations of concentrated hydrochloric acid and concentrated nitric acid. Residual organic material was removed by treatment with concentrated nitric acid and 30% hydrogen peroxide. Samples were dissolved in 500 mL of 0.5 M hydrochloric acid and transferred to labeled Nalgene bottles.

Sample portions of 100 mL of the digestate were analyzed for polonium-210 content. Solid ascorbic acid was added to each sample to reduce iron. Samples were heated gently and polonium was spontaneously deposited onto a nickel disc. Following deposition, each disc was rinsed with DI, dried, and submitted for alpha spectroscopy counting.

Sample portions of 100 mL of the digestate were analyzed for sequential Am, Pu, and U content. Samples were pre-concentrated using a lanthanum fluoride co-precipitation. The fluoride precipitate was collected on a 47 mm 0.100 micrometer polypropylene filter. The filters were destroyed by ashing in a glass beaker in a muffle furnace set at 550C overnight. The fluoride precipitate was dissolved in hydrochloric acid/boric acid solution. Samples were preconcentrated using an iron hydroxide scavenge and uranium and plutonium were purified using routine anion exchange techniques. Americium was further purified using extraction chromatography. Am, Pu, and U samples were prepared for counting and counted using routine procedures.

Table of Contents
(Environmental)

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	Area (mm2)	Mass (g)
00A1057-002.001	2254	5.973
00A1057-003.001	2450	6.447
00A1057-004.001	2500	6.745
00A1057-005.001	2625	6.988
00A1057-006.001	2600	6.839
00A1057-007.001	2397	6.329
00A1057-008.001	2209	6.171
00A1057-009.001	2575	6.669
00A1057-010.001	2500	6.697
00A1057-011.001	2425	6.487
00A1057-012.001	2808	7.732
00A1057-013.001	2842	7.694
00A1057-014.001	2322	6.376
00A1057-015.001	2550	6.884
00A1057-016.001	2425	6.388
00A1057-017.001	2619	6.895
00A1057-018.001	2600	6.739
00A1057-019.001	2652	6.992
00A1057-020.001	2250	6.255
00A1057-021.001	liquid	liquid

20987% 32 lbs # 200D010637

Commodore Advanced Sciences, Inc.

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A1057#001

Page 1 of 3

Collector [redacted]	Contact/Requester SZYDLOWSKI, TOM	Telephone No. 8165	MSIN FAX
RIN 00A1057	Sampling Origin T-112 B North of B 208	Purchase Order/Charge Code	
Project Title Roof Samples	Logbook No. MCKER	Ice Chest No. N/A	Temp. N/A
To (Lab) General Engineering	Method of Shipment Sample Team	Bill of Lading/Air Bill No. 4533 2125 5780	
Protocol CAS 5 of 007	Related COC (if any) N/A	PRE N/A	

POSSIBLE SAMPLE HAZARDS/REMARKS
** Each sample contains twice the amount required for analysis. The lab is to split the sample, measure and report the area and weight of the portion selected for analysis. **

SCREENING REQUIRED ☐

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☐ No ☐
Event 001 is to be used for matrix investigation. Two specimens have been provided for the lab to determine the final volume and tracer spike levels. Contact R. Kinney for details.
-pH 2 DN ~~00~~-021-

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
00A1057-001.001	SITE 4 M1	WASTE	01/18/00	1345 ~~1255~~	T-112 B	1-SAMPLE P/G	TR01A188 (Matrix Investigation) [Routine]	N/A None
00A1057-001.002	SITE M2	WASTE	↓	↓	T-112 B	1-SAMPLE P/G	TR01A188 (Matrix Investigation) [Routine]	N/A None
00A1057-002.001	Site #4	WASTE	1/18/00	1255	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine] 11gm	None None
00A1057-003.001	Site # 5	WASTE		1305	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-004.001	SITE #8	WASTE		1312	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-005.001	SITE #7	WASTE		1316	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-006.001	SITE #14	WASTE		1320	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[redacted]	1600 01/18/00	T891R Fridge #2	1600 01/18/00	T891R Fridge #2	1-24-00 1330	L. Miller	1-24-00 1330
L. Miller	1-24-00 1500	Fed Ex				L. Maier	1-25-00 10:30

FINAL SAMPLE DISPOSITION — Disposal Method (e.g., Return to customer, per lab procedure, used in process) — Disposed By — Date/Time

Commodore Advanced Sciences, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A1057#001

RIN 00A1057 | Contact/Requestor SZYDLOWSKI, TOM | Telephone No. 8165 | MSIN | FAX

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative; Packing
00A1057-007.001	SITE #2	WASTE	01/18/00	1325	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-008.001	9	WASTE		1330	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-009.001	12	WASTE		1335	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-010.001	13	WASTE		1340	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-011.001	1	WASTE		1346	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-012.001	6	WASTE		1350	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-013.001	6	WASTE		1350	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-014.001	16	WASTE		1400	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-015.001	17	WASTE		1400	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-016.001	18	WASTE		1402	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-017.001	10	WASTE		1415	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible] C&S	1600 01/18/00	T89 FRIDGE #2	1600 01/18/00	T89 Fridge #2	1-24-00 1330	L. Miller	1-24-00 1330
L. Miller	1-24-00 1500	Fed Ex				P. Power	1-25-00 10:30

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

Commodore Advanced Sciences, Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A1057#001

Page 3 of 3

RIN 00A1057 | Contact/Requestor SZYDLOWSKI, TOM | Telephone No. 8165 | MSIN | FAX

Bottle No.	Customer Number	Matrix	Date	Time	Location	No/Type Container	Sample Analysis	Preservative ; Packing
00A1057-018.001	SITE # 3	WASTE	01/18/00	1430	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-019.001	11	WASTE		1435	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-020.001	15	WASTE		1445	T-112 B	1-SAMPLE P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	None None
00A1057-021.001	RINSE	WASTE		1500	T-112 B	4-L P/G	TR01A187 (Po-210, Pu, Am, U) [Routine]	HN03 None

00/18/00

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
CAS	01/18/00 1600	T89 R CRIB #2	01/18/00 1600	T89 R Fridge #2	1-24-00 1330	S. Miller	1-24-00 1330
S. Miller	1-24-00 1500	Fed Ex				P. Power	1-25-00 10:3

FINAL SAMPLE DISPOSITION | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

Appendix 4

Asbestos Inspection Report

NVLAP LAB NO. 1896

ASBESTOS - TEM, PCM, PLM, SEM
METALS - AA, FLAME/FURNACE
AIRBORNE PARTICULATES
SPECIAL PARTICLE ANALYSIS

LAB I.D. 10768

RESERVOIRS ENVIRONMENTAL
SERVICES, INC.

1827 GRANT STREET DENVER, COLORADO 80203 (800) 678-7374 (303) 830-1986 FAX (303) 863-9196

July 19, 1994

Ms. Julie Linkus
EG&G Rocky Flats Plant
PO Box 464
Golden, CO 80402-0464

RE: Job No. RES 20798 - 23586JL/149A - Bulk Samples: 112B9407137301, 112B9407137302, 112B9407137303, 112B9407137304, 112B9407137305 and 112B9407137306.

Dear Ms. Linkus:

Reservoirs Environmental Services, Inc. (RES, Inc.) has analyzed six bulk material samples by Polarized Light Microscopy (PLM) for asbestos content as per your request. The samples were received on July 15, 1994, and initial results were telephoned to your office on July 18, 1994. PLM was used to analyze the bulk materials in compliance with guidelines established by the USEPA (40 CFR Part 763, Subpart F, Appendix A). The Analytical Results are presented in Table I.

RES, Inc. has assigned job number RES 20798 to this study. This report is considered highly confidential and the sole property of EG&G Rocky Flats Plant. RES, Inc. will not discuss any part of this study with personnel other than those of the client company. Samples will be disposed of after sixty days unless longer storage is requested. The US EPA guideline (40 CFR Part 763, Subpart F, Appendix A) was developed for use on friable building materials and is not recommended for non-friable materials such as floor tiles. RES, Inc. recommends additional analyses to confirm negative PLM results on floor tiles.

If you should have any questions about this report, please feel free to call me at 830-1986.

Sincerely,

Robert K. Dickson
Assistant Division Manager

RKD/cma

Analyst(s):
Cheryl A. Dempsey
Greg Behnfeldt
Patrick Coughlan
Paul D. Lo Scalzo
Robert L. Gault

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: RES 20798
Client: EG&G Rocky Flats Plant
Client Project: 23586JL/149A
Date Samples Received: July 15, 1994
Analysis Type: PLM Short Report
Turnaround: 3-5 Day

Client Sample Number	Lab ID Number	TOTAL ASBESTOS (%)	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non-Asbestos Fibrous Components (%) CELL	GLASS	SYNTH	HAIR	WOOL	TALC	OTHER	Non-Fibrous Components (%)
112B9407137301	EM 128810	ND	A	White paint	5		ND	4	0	0	0	0	0	0	96
			B	Tan fibrous material	35		ND	80	0	0	0	0	0	0	20
			C	White fibrous plaster	60		ND	5	8	0	0	0	0	0	87
112B9407137302	EM 128811	ND	A	White paint	5		ND	5	0	0	0	0	0	0	95
			B	Tan fibrous material	30		ND	90	0	0	0	0	0	0	10
			C	White fibrous plaster	65		ND	5	10	0	0	0	0	0	85
112B9407137303	EM 128812	ND	A	White paint	5		ND	5	0	0	0	0	0	0	95
			B	Tan fibrous material	30		ND	90	0	0	0	0	0	0	10
			C	White fibrous plaster	65		ND	5	10	0	0	0	0	0	85
112B9407137304	EM 128813	6.0	A	White fibrous material w/ tan resinous material	10		ND	0	0	90	0	0	0	0	10
			B	Multicolored fibrous material	20		ND	0	0	98	0	0	0	0	2
			C	Tan fibrous material	20		ND	90	0	0	0	0	0	0	10
			D	Gray tile	50	Chrysotile	12	0	0	0	0	0	0	0	88

ND = None Detected
TR = Trace
CELL = Cellulose
Mat = Material
ORG = Organic
BRUC = Brucite
WOLL = Wollastonite
Trem-Act = Tremolite-Actinolite
GYP = Gypsum
SYNTH = Synthetic

Analyst: PC/CD

Data QA

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: RES 20798
Client: EG&G Rocky Flats Plant
Client Project: 23586JL/149A
Date Samples Received: July 15, 1994
Analysis Type: PLM Short Report
Turnaround: 3-5 Day

Client Sample Number	Lab ID Number	TOTAL ASBESTOS (%)	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non-Asbestos Fibrous Components (%) CELL	GLASS	GYPSUM	HAIR	WOLL	TALC	OTHER	Non-Fibrous Components (%)
112B9407137305	EM 128814	ND	A	Gray fibrous material	30		ND	0	0	98	0	0	0	0	2
			B	Tan fibrous resinous material	20		ND	90	0	0	0	0	0	0	10
			C	Multicolored fibrous material	30		ND	0	0	98	0	0	0	0	2
			D	Gray tile	30		ND	0	0	0	0	0	0	0	100
112B9407137306	EM 128815	ND	A	Tan fibrous resinous material	20		ND	90	0	0	0	0	0	0	10
			B	Gray fibrous material	20		ND	0	0	98	0	0	0	0	2
			C	Multicolored fibrous material	60		ND	0	0	95	0	0	0	0	5

ND = None Detected
TR = Trace
CELL = Cellulose
Mat = Material
ORG = Organic
BRUC = Brucite
WOLL = Wollastonite
Trem-Act = Tremolite-Actinolite
GYP = Gypsum
SYNTH = Synthetic

Data QA

93

1. Sample # (Bldg-Y-M-D-P#-S#)
1 12B 94 07 13 73 01 ☐ SINGLE
through
1 12B 94 07 13 73 06 ☒ MULTIPLE

ROCKY FLATS PLANT
INDUSTRIAL HYGIENE BULK SAMPLE FORM

2. Process Title:
3. Subprocess Title:
4. Building/OU Etc.: T 112B
5. Chain of Custody Seal #:
6. Analytical Sample Method: PLM
7. Lab Report #:
8. Lab Method:
9. Related Forms:

10. Sample # (Bldg-Y-M-D-P#-S#)	11. Location Information	12. Material Type	13. Bulk Sample Description	14. Results
112B940713730	Ceiling - East (near light)	misc.	RS Grid 4	
112B940713702	Ceiling - NW		RS Grid 4	
112B940713703	Ceiling South (near door & window)		RS Grid 4	
112B940713704	Floor tile - East - (under desk)		RS Grid 5	
112B940713705	Floor tile - West (under desk near window)		RS GRID 5	
112B940713706	Floor ~~tile~~ SE (under desk)		RS GRID 5	

15. Sampled by/Date: [signature] 7-13-94
16. Checked by/Date (Check Back of Form):

EG&G Rocky ..uts Plant, Inc.

Golden, CO 80402-0464

Safety and Hygiene Chain of Custody Record and Analysis Request

Name of Originator: W.D. Lockwood Title: Asbestos Coordinator Bldg/Ext: T441A/3484 Date: 7-13-94 Page 1 of 1

SAMPLE NUMBER Bldg/Y/M/D/P#/S#	ANALYZE FOR	VOLUME liters	SAMPLE TIME/	MEDIA	P A B	Personal Area Bulk	REMARKS	Lab Number
112B94071373 01	Asbestos				B			
112B94071373 02	↓				↓			
112B94071373 03								
112B94071373 04								
112B94071373 05								
112B94071373 06								

Relinquished by	Received by	Time/Date	Relinquished by	Received by	Time/Date
W.D. Lockwood	[illegible]	1520 7/13/94			
Relinquished by	Received by	Time/Date	Relinquished by	Received by	Time/Date
Relinquished by	Received by	Time/Date	Relinquished by	Received by	Time/Date
Relinquished by	Received by	Time/Date	Relinquished by	Received by	Time/Date

Report and Billing Instruction

Verbal To: N/A

Fax To: J.M. Linkus

Report To: J.M. Linkus

Bill To: EG&G

P.O.#/Release: 235863L 1414A

Analysis Request

Industrial Hygiene Sample

☐ Standard Service ☐ Rush ☐ Other_____

Asbestos Samples

☒ Standard ☐ 24 ☐ 2 ☐ Other_____

Seal# (Release #) N/A

Condition of Seal: ☐ Broken ☐ Unbroken

Signature:_____

Comments:_____

Rocky Flats Plant Asbestos Containing Material
INSPECTION CHECKLIST
Appendix 1

1. Inspector W.D. Lockwood Signature [signature] Accreditation # [redacted] State CO
Data 112B

2. BUILDING NO.: T112B
BLDG. AREA CODE: _____
- ■ 1. 1st Floor
- ☐ 2. 2nd Floor
- ☐ 3. 3rd Floor
- ☐ 4. 4th Floor
- ☐ 5. Basement
- ☐ 6. Crawl Space
- ☐ 7. Roof
- ☐ 8. Exterior of Bldg.
- ☐ 9. Plenum
- ☐ 10. Other

3. ROOM NUMBER: _____
COLUMN NUMBERS _____

4. SPECIFIC LOCATION NE Corner

5. % FUNCTIONAL SPACE ~~[illegible]~~ unknow due to carpet overlay

6. FUNCTIONAL SPACE I.D. 22
HOMOGENEOUS AREA I.D. 02 Floor Structure

7. MATERIAL TYPE CATEGORY:
- ☐ T. Thermal System Insulation
- ☐ S. Surfacing Material
- ■ M. Miscellaneous Material

8.1 TSI ACM:
PIPE LENGTH (FT) _____

8.2 TSI ACM:
PIPE DIAMETER (IN.) _____

8.3 TSI ACM:
PIPE WITH INSULATION DIAMETER (IN.)
_____

8.4 SURFACING MISC. ACM:

8.5 TOTAL SURFACE MATERIAL (SQ. FT.)
unknown

8.6 SURFACING MISC ACM:
DEPTH OF SURFACE MATERIAL (IN.)
1/4 inch

9.1 FUNCTION CODE:
- ☐ 1. Acoustic Insulation
- ☐ 2. Baseboard
- ☐ 3. Boiler/Furnace Insulation
- ☐ 4. Caulking Matl
- ☐ 5. Ceiling Tile
- ☐ 6. Chilled Water Pipe
- ☐ 7. Chilled Water Pipe Fitting
- ☐ 8. Cold Water Pipe
- ☐ 9. Cold Water Pipe Fitting
- ☐ 10. Condensate Pipe
- ☐ 11. Condensate Pipe Fitting
- ☐ 12. Cooling Tower Baffles
- ☐ 13. Debris/Settled Dust
- ☐ 14. Domestic Cold Water Pipe
- ☐ 15. Domestic Cold Water Fitting
- ☐ 16. Door
- ☐ 17. Drain Pipe
- ☐ 18. Duct Insulation
- ☐ 19. Exterior Construction
- ■ 20. Floor Tile
- ☐ 21. Fire Stop
- ☐ 22. Fireproofing Insulation
- ☐ 23. High Temp Water Pipe
- ☐ 24. High Temp Water Pipe Fitting
- ☐ 25. Mastic Adhesive
- ☐ 26. Roofing
- ☐ 27. Steam Pipe
- ☐ 28. Steam Pipe Fitting
- ☐ 29. Tank Insulation
- ☐ 30. Transite Board
- ☐ 31. Vibration Damper
- ☐ 32. Wall Board
- ☐ 33. Wall Insulation
- ☐ 34. Wall Plaster/Spackle
- ☐ 35. Other: _____

9.2 ASBESTOS FORM CODE:
- ☐ 1. Air cell
- ☐ 2. Blanket
- ☐ 3. Block
- ☐ 4. Cloth
- ☐ 5. Loose fill
- ■ 6. Pre-formed
- ☐ 7. Sheet
- ☐ 8. Sprayed On
- ☐ 9. Troweled On
- ☐ 10. Other: _____

9.3 COLOR CODE:
- ☐ B Blue
- ☐ BL Black
- ☐ BR Brown
- ☐ G Green
- ■ GR Gray
- ☐ O Orange
- ☐ W White
- ☐ Y Yellow
- ☐ OT Other: _____

10. CONSISTENCY:
- ■ Brittle - hard
- ☐ Semi - solid
- ☐ Fibrouse - loose
- ☐ Granular - pliable

11. CURRENTLY FRIABLE:
- ☐ Yes
- ■ No

12. CURRENT MATERIAL DAMAGE:
- ■ 1. No Visible Damage (U)
- ☐ 2. Damaged (D)
  < 10% Localized or
  < 25% Distributed
- ☐ 3. Significant Damage (S)
  10% or more Localized or
  25% or more Distributed

12.1 CAUSE OF DAMAGE:
- ☐ 1. Area Usage
- ☐ 2. Vibration
- ☐ 3. Air Flow n/a
- ☐ 4. Water Damage
- ☐ 5. Service Activity
- ☐ 6. Usual Aging
- ☐ 7. Other: _____

13. CONTAMINANT PRESENT:
- ■ 0. None
- ☐ 1. Spotty
- ☐ 2. Widely Scattered
- ☐ 3. Entire Area

14. DISPERSAL FACTOR:
- ☐ 1. Water
- ☐ 2. Air
- ■ 3. Occupant
- ☐ 4. Machinery

15. AREA USED BY:
- ☐ Maintenance Workers
- ☐ Operations Workers
- ■ Administrative Personnel
- ☐ Visiting Public

16. POTENTIAL FOR DAMAGE:
- ■ Low Potential for damage (L)
- ☐ Potential for damage (M)
- ☐ Potential for significant damage (H)

17.1 DISTURBANCE POTENTIAL
FREQUENCY OF CONTACT/ACCESSIBILITY:
- ■ 0. Low/Seldom (< 1 time/month) (e.g., Area Rarely Used)
- ☐ 1. Moderate/Occasional (1-4 times/month) (e.g., Rooms/Offices)
- ☐ 2. High/Frequently (>4 times/month) (e.g., Hallways/Corridors)

17.2 DISTURBANCE POTENTIAL
INFLUENCE OF VIBRATION:
- ■ 0. Low/None
- ☐ 1. Moderate/Noticeable (Motors, loud sounds, vibrating ducts w/o fan, etc.)
- ☐ 2. High/Extreme (Easily sensed vibration, vibrating duct w/fan, etc.)

17.3 DISTURBANCE POTENTIAL
POTENTIAL FOR AIR EROSION:
- ■ 0. Low/None
- ☐ 1. Moderate or Noticeable Movement (Air shaft, Air stream, vent, etc.)
- ☐ 2. High/Extreme velocity (Air Plenum, Elevator Shaft, Fan Room, etc.)

17.4 DISTURBANCE POTENTIAL
OVERALL POTENTIAL FOR DAMAGE:
- ■ 0. Low Potential for Damage
- ☐ 1. Potential for Damage
- ☐ 2. Potential for Significant Damage n/A

18. PHYSICAL ASSESSMENT CATEGORY:
- ☐ 1. Damaged or Significantly Damaged TSI ACM
- ☐ 2. Damaged Friable Surfacing ACM
- ☐ 3. Significantly Damaged Friable Surfacing ACM
- ☐ 4. Damaged or Significantly Damaged Misc. ACM
- ☐ 5. ACBM with Potential for Damage
- ☐ 6. ACBM with Potential for Significant Damage
- ☐ 7. Any remaining Friable ACBM or Friable suspect ACBM

19. HAZARD POTENTIAL CLASSIFICATION:
- ■ 1. ACBM in good condition w/low potential for disturbance
- ☐ 2. ACBM in good condition w/potential for damage
- ☐ 3. ACBM in good condition w/potential for significant damage
- ☐ 4. ACBM in Damaged condition w/low potential for disturbance
- ☐ 5. ACBM in Damaged condition w/potential for damage
- ☐ 6. ACBM in Damaged condition w/potential for significant damage
- ☐ 7. ACBM in a Significantly Damaged condition

20. RECOMMENDED RESPONSE ACTION:
- ☐ 1. Response Action #1
- ☐ 2. Response Action #2
- ☐ 3. Response Action #3
- ☐ 4. Response Action #4
- ☐ 5. Response Action #5
- ☐ 6. Response Action #6
- ☐ 7. Response Action #7
- ■ 8. Response Action #8

21. DAMAGED INVENTORY PRIORITY
☐ 1 ☐ 2A ☐ 2B ■ 3

22. PLANNED ACTIVITY:
- ☐ New Activity/Use
- ☐ System Maintenance n/A
- ☐ Required Repair
- ☐ Renovation
- ☐ Demolition

23. OTHER SYSTEMS IMPACTED:
- ☐ System Shutdown
- ☐ Backup System In Use n/A
- ☐ No Backup/Alternate
- ☐ Routine System Maintenance

24. POTENTIAL WASTE:
- ■ Non friable
- ☐ Regulated ACM
- ☐ Radiological Contaminated
- ☐ RCRA Contaminated

25. SAMPLING:
- ■ ≥ 3, Non ACM, < 1000 ft.²
- ☐ ≥ 5, Non ACM, < 5,000 ft.²
- ☐ ≥ 7, Non ACM, > 5,000 ft.²
- ☐ ≥ 9, Non ACM
- ☐ 0, Assumed ACM

25.1

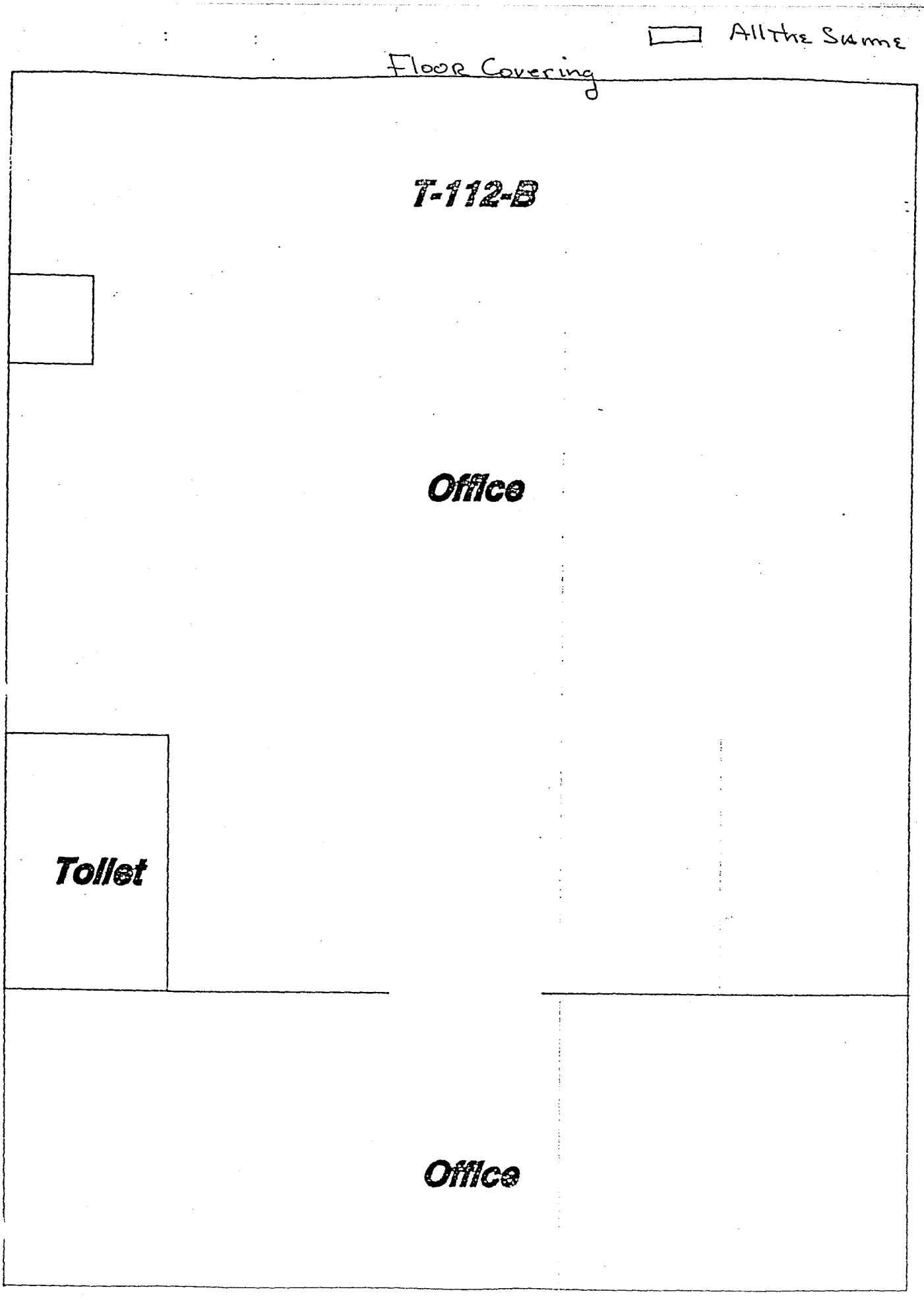
Sample #	%	Asbestos Type
#4	60%	

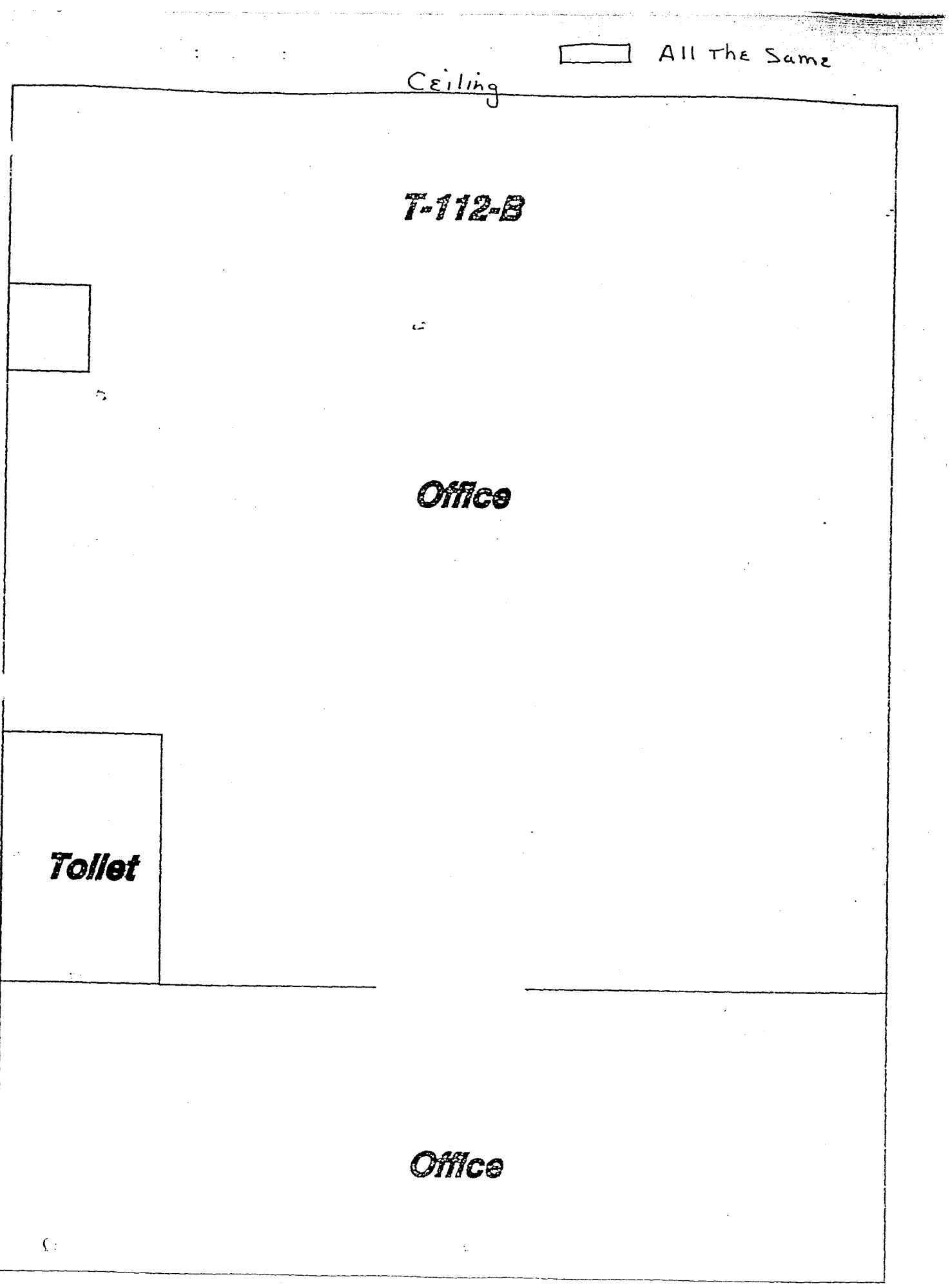
25.2 LAB REPORT _____

28. WORK PACKAGE NUMBERS
_____

27. COMMENTS: Carpeted floor tile
_____
_____
_____

97


All the Same
Floor Covering
T-112-B
Office
Tollet
Office


All The Same
Ceiling
T-112-B
Office
Toilet
Office

INSPECTION CHECKLIST
Appendix 1

1. Inspector W.D. LocKwood Signature [signature] Accreditation # [redacted]
Date _____

2. BUILDING NO.: _____
BLDG. AREA CODE: _____
- ☐ 1. 1st Floor
- ☐ 2. 2nd Floor
- ☐ 3. 3rd Floor
- ☐ 4. 4th Floor
- ☐ 5. Basement
- ☐ 6. Crawl Space
- ☐ 7. Roof
- ☐ 8. Exterior of Bldg.
- ☐ 9. Plenum
- ☐ 10. Other

3. ROOM NUMBER: _____
COLUMN NUMBERS _____

4. SPECIFIC LOCATION _____

5. % FUNCTIONAL SPACE _____

6. FUNCTIONAL SPACE I.D. _____
HOMOGENEOUS AREA I.D. _____

7. MATERIAL TYPE CATEGORY:
- ☐ T. Thermal System Insulation
- ☐ S. Surfacing Material
- ☐ M. Miscellaneous Material

8.1 TSI ACM:
PIPE LENGTH (FT) _____

8.2 TSI ACM:
PIPE DIAMETER (IN.) _____

8.3 TSI ACM:
PIPE WITH INSULATION DIAMETER (IN.)
_____

8.4 SURFACING MISC. ACM:

8.5 TOTAL SURFACE MATERIAL (SQ. FT.)
_____

8.6 SURFACING/MISC ACM:
DEPTH OF SURFACE MATERIAL (IN.)
_____

9.1 FUNCTION CODE:
- ☐ 1. Acoustic Insulation
- ☐ 2. Baseboard
- ☐ 3. Boiler/Furnace Insulation
- ☐ 4. Caulking Matl
- ☐ 5. Ceiling Tile
- ☐ 6. Chilled Water Pipe
- ☐ 7. Chilled Water Pipe Fitting
- ☐ 8. Cold Water Pipe
- ☐ 9. Cold Water Pipe Fitting
- ☐ 10. Condensate Pipe
- ☐ 11. Condensate Pipe Fitting
- ☐ 12. Cooling Tower Baffles
- ☐ 13. Debris/Settled Dust
- ☐ 14. Domestic Cold Water Pipe
- ☐ 15. Domestic Cold Water Fitting
- ☐ 16. Door
- ☐ 17. Drain Pipe
- ☐ 18. Duct Insulation
- ☐ 19. Exterior Construction
- ☐ 20. Floor Tile
- ☐ 21. Fire Stop
- ☐ 22. Fireproofing Insulation
- ☐ 23. High Temp Water Pipe
- ☐ 24. High Temp Water Pipe Fitting
- ☐ 25. Mastic Adhesive
- ☐ 26. Roofing
- ☐ 27. Steam Pipe
- ☐ 28. Steam Pipe Fitting
- ☐ 29. Tank Insulation
- ☐ 30. Transite Board
- ☐ 31. Vibration Damper
- ☐ 32. Wall Board
- ☐ 33. Wall Insulation
- ☐ 34. Wall Plaster/Spackle
- ☐ 35. Other: _____

9.2 ASBESTOS FORM CODE:
- ☐ 1. Air cell
- ☐ 2. Blanket
- ☐ 3. Block
- ☐ 4. Cloth
- ☐ 5. Loose fill
- ☐ 6. Pre-formed
- ☐ 7. Sheet
- ☐ 8. Sprayed On
- ☐ 9. Troweled On
- ☐ 10. Other: _____

9.3 COLOR CODE:
- ☐ B Blue
- ☐ BL Black
- ☐ BR Brown
- ☐ G Green
- ☐ GR Gray
- ☐ O Orange
- ☐ W White
- ☐ Y Yellow
- ☐ OT Other: _____

10. CONSISTENCY:
- ☐ Brittle - hard
- ☐ Semi - solid
- ☐ Fibrouse - loose
- ☐ Granular - pliable

11. CURRENTLY FRIABLE:
- ☐ Yes
- ☐ No

12. CURRENT MATERIAL DAMAGE:
- ☐ 1. No Visible Damage (U)
- ☐ 2. Damaged (D)
  < 10% Localized or
  < 25% Distributed
- ☐ 3. Significant Damage (S)
  10% or more Localized or
  25% or more Distributed

12.1 CAUSE OF DAMAGE:
- ☐ 1. Area Usage
- ☐ 2. Vibration
- ☐ 3. Air Flow
- ☐ 4. Water Damage
- ☐ 5. Service Activity
- ☐ 6. Usual Aging
- ☐ 7. Other: _____

13. CONTAMINANT PRESENT:
- ☐ 0. None
- ☐ 1. Spotty
- ☐ 2. Widely Scattered
- ☐ 3. Entire Area

14. DISPERSAL FACTOR:
- ☐ 1. Water
- ☐ 2. Air
- ☐ 3. Occupant
- ☐ 4. Machinery

15. AREA USED BY:
- ☐ Maintenance Workers
- ☐ Operations Workers
- ☐ Administrative Personnel
- ☐ Visiting Public

16. POTENTIAL FOR DAMAGE:
- ☐ Low Potential for damage (L)
- ☐ Potential for damage (M)
- ☐ Potential for significant damage (H)

17.1 DISTURBANCE POTENTIAL
FREQUENCY OF CONTACT/ACCESSIBILITY:
- ☐ 0. Low/Seldom (< 1 time/month) (e.g., Area Rarely Used)
- ☐ 1. Moderate/Occasional (1-4 times/month) (e.g., Rooms/Offices)
- ☐ 2. High/Frequently (>4 times/month) (e.g., Hallways/Corridors)

17.2 DISTURBANCE POTENTIAL
INFLUENCE OF VIBRATION:
- ☐ 0. Low/None
- ☐ 1. Moderate/Noticeable (Motors, loud sounds, vibrating ducts w/o fan, etc.)
- ☐ 2. High/Extreme (Easily sensed vibration, vibrating duct w/fan, etc.)

17.3 DISTURBANCE POTENTIAL
POTENTIAL FOR AIR EROSION:
- ☐ 0. Low/None
- ☐ 1. Moderate or Noticeable Movement (Air shaft, Air stream, vent, etc.)
- ☐ 2. High/Extreme velocity (Air Plenum, Elevator Shaft, Fan Room, etc.)

17.4 DISTURBANCE POTENTIAL
OVERALL POTENTIAL FOR DAMAGE:
- ☐ 0. Low Potential for Damage
- ☐ 1. Potential for Damage
- ☐ 2. Potential for Significant Damage

18. PHYSICAL ASSESSMENT CATEGORY:
- ☐ 1. Damaged or Significantly Damaged TSI ACM
- ☐ 2. Damaged Friable Surfacing ACM
- ☐ 3. Significantly Damaged Friable Surfacing ACM
- ☐ 4. Damaged or Significantly Damaged Misc. ACM
- ☐ 5. ACBM with Potential for Damage
- ☐ 6. ACBM with Potential for Significant Damage
- ☐ 7. Any remaining Friable ACBM or Friable suspect ACBM

19. HAZARD POTENTIAL CLASSIFICATION:
- ☐ 1. ACBM in good condition w/low potential for disturbance
- ☐ 2. ACBM in good condition w/potential for damage
- ☐ 3. ACBM in good condition w/potential for significant damage
- ☐ 4. ACBM in Damaged condition w/low potential for disturbance
- ☐ 5. ACBM in Damaged condition w/potential for damage
- ☐ 6. ACBM in Damaged condition w/potential for significant damage
- ☐ 7. ACBM in a Significantly Damaged condition

20. RECOMMENDED RESPONSE ACTION:
- ☐ 1. Response Action #1
- ☐ 2. Response Action #2
- ☐ 3. Response Action #3
- ☐ 4. Response Action #4
- ☐ 5. Response Action #5
- ☐ 6. Response Action #6
- ☐ 7. Response Action #7
- ☐ 8. Response Action #8

21. DAMAGED INVENTORY PRIORITY
☐ 1 ☐ 2A ☐ 2B ☐ 3

22. PLANNED ACTIVITY:
- ☐ New Activity/Use
- ☐ System Maintenance
- ☐ Required Repair
- ☐ Renovation
- ☐ Demolition

23. OTHER SYSTEMS IMPACTED:
- ☐ System Shutdown
- ☐ Backup System In Use
- ☐ No Backup/Alternate
- ☐ Routine System Maintenance

24. POTENTIAL WASTE:
- ☐ Non friable
- ☐ Regulated ACM
- ☐ Radiological Contaminated
- ☐ RCRA Contaminated

25. SAMPLING:
- ☐ ≥ 3, Non ACM, < 1000 ft.²
- ☐ ≥ 5, Non ACM, < 5,000 ft.²
- ☐ ≥ 7, Non ACM, > 5,000 ft.²
- ☐ ≥ 9, Non ACM
- ☐ 0, Assumed ACM

25.1

Sample #	%	Asbestos Type

25.2 LAB REPORT _____

26. WORK PACKAGE NUMBERS
_____

27. COMMENTS: _____
_____
_____
_____
_____

INSPECTION CHECKLIST
Appendix 1

1. Inspector W.D. Lockwood Signature [signature] Accreditation # [redacted] State [redacted]
   Data _____

2. BUILDING NO.: _____
   BLDG. AREA CODE: _____
   - ☐ 1. 1st Floor
   - ☐ 2. 2nd Floor
   - ☐ 3. 3rd Floor
   - ☐ 4. 4th Floor
   - ☐ 5. Basement
   - ☐ 6. Crawl Space
   - ☐ 7. Roof
   - ☐ 8. Exterior of Bldg.
   - ☐ 9. Plenum
   - ☐ 10. Other

3. ROOM NUMBER: _____
   COLUMN NUMBERS _____

4. SPECIFIC LOCATION _____

5. % FUNCTIONAL SPACE _____

6. FUNCTIONAL SPACE I.D. _____
   HOMOGENEOUS AREA I.D. _____

7. MATERIAL TYPE CATEGORY:
   - ☐ T. Thermal System Insulation
   - ☐ S. Surfacing Material
   - ☐ M. Miscellaneous Material

8.1 TSI ACM:
PIPE LENGTH (FT) _____

8.2 TSI ACM:
PIPE DIAMETER (IN.) _____

8.3 TSI ACM:
PIPE WITH INSULATION DIAMETER (IN.)
_____

8.4 SURFACING MISC. ACM:

8.5 TOTAL SURFACE MATERIAL (SQ. FT.)
_____

8.6 SURFACING/MISC ACM:
DEPTH OF SURFACE MATERIAL (IN.)
_____

9.1 FUNCTION CODE:
- ☐ 1. Acoustic Insulation
- ☐ 2. Baseboard
- ☐ 3. Boiler/Furnace Insulation
- ☐ 4. Caulking Matl
- ☐ 5. Ceiling Tile
- ☐ 6. Chilled Water Pipe
- ☐ 7. Chilled Water Pipe Fitting
- ☐ 8. Cold Water Pipe
- ☐ 9. Cold Water Pipe Fitting
- ☐ 10. Condensate Pipe
- ☐ 11. Condensate Pipe Fitting
- ☐ 12. Cooling Tower Baffles
- ☐ 13. Debris/Settled Dust
- ☐ 14. Domestic Cold Water Pipe
- ☐ 15. Domestic Cold Water Fitting
- ☐ 16. Door
- ☐ 17. Drain Pipe
- ☐ 18. Duct Insulation
- ☐ 19. Exterior Construction
- ☐ 20. Floor Tile
- ☐ 21. Fire Stop
- ☐ 22. Fireproofing Insulation
- ☐ 23. High Temp Water Pipe
- ☐ 24. High Temp Water Pipe Fitting
- ☐ 25. Mastic Adhesive
- ☐ 26. Roofing
- ☐ 27. Steam Pipe
- ☐ 28. Steam Pipe Fitting
- ☐ 29. Tank Insulation
- ☐ 30. Transite Board
- ☐ 31. Vibration Damper
- ☐ 32. Wall Board
- ☐ 33. Wall Insulation
- ☐ 34. Wall Plaster/Spackle
- ☐ 35. Other: _____

9.2 ASBESTOS FORM CODE:
- ☐ 1. Air cell
- ☐ 2. Blanket
- ☐ 3. Block
- ☐ 4. Cloth
- ☐ 5. Loose fill
- ☐ 6. Pre-formed
- ☐ 7. Sheet
- ☐ 8. Sprayed On
- ☐ 9. Troweled On
- ☐ 10. Other: _____

9.3 COLOR CODE:
- ☐ B Blue
- ☐ BL Black
- ☐ BR Brown
- ☐ G Green
- ☐ GR Gray
- ☐ O Orange
- ☐ W White
- ☐ Y Yellow
- ☐ OT Other: _____

10. CONSISTENCY:
- ☐ Brittle - hard
- ☐ Semi - solid
- ☐ Fibrouse - loose
- ☐ Granular - pliable

11. CURRENTLY FRIABLE:
- ☐ Yes
- ☐ No

12. CURRENT MATERIAL DAMAGE:
- ☐ 1. No Visible Damage (U)
- ☐ 2. Damaged (D)
  - < 10% Localized or
  - < 25% Distributed
- ☐ 3. Significant Damage (S)
  - 10% or more Localized or
  - 25% or more Distributed

12.1 CAUSE OF DAMAGE:
- ☐ 1. Area Usage
- ☐ 2. Vibration
- ☐ 3. Air Flow
- ☐ 4. Water Damage
- ☐ 5. Service Activity
- ☐ 6. Usual Aging
- ☐ 7. Other: _____

13. CONTAMINANT PRESENT:
- ☐ 0. None
- ☐ 1. Spotty
- ☐ 2. Widely Scattered
- ☐ 3. Entire Area

14. DISPERSAL FACTOR:
- ☐ 1. Water
- ☐ 2. Air
- ☐ 3. Occupant
- ☐ 4. Machinery

15. AREA USED BY:
- ☐ Maintenance Workers
- ☐ Operations Workers
- ☐ Administrative Personnel
- ☐ Visiting Public

16. POTENTIAL FOR DAMAGE:
- ☐ Low Potential for damage (L)
- ☐ Potential for damage (M)
- ☐ Potential for significant damage (H)

17.1 DISTURBANCE POTENTIAL
FREQUENCY OF CONTACT/ACCESSIBILITY:
- ☐ 0. Low/Seldom (< 1 time/month) (e.g., Area Rarely Used)
- ☐ 1. Moderate/Occasional (1-4 times/month) (e.g., Rooms/Offices)
- ☐ 2. High/Frequently (>4 times/month) (e.g., Hallways/Corridors)

17.2 DISTURBANCE POTENTIAL
INFLUENCE OF VIBRATION:
- ☐ 0. Low/None
- ☐ 1. Moderate/Noticeable (Motors, loud sounds, vibrating ducts w/o fan, etc.)
- ☐ 2. High/Extreme (Easily sensed vibration, vibrating duct w/fan, etc.)

17.3 DISTURBANCE POTENTIAL
POTENTIAL FOR AIR EROSION:
- ☐ 0. Low/None
- ☐ 1. Moderate or Noticeable Movement (Air shaft, Air stream, vent, etc.)
- ☐ 2. High/Extreme velocity (Air Plenum, Elevator Shaft, Fan Room, etc.)

17.4 DISTURBANCE POTENTIAL
OVERALL POTENTIAL FOR DAMAGE:
- ☐ 0. Low Potential for Damage
- ☐ 1. Potential for Damage
- ☐ 2. Potential for Significant Damage

18. PHYSICAL ASSESSMENT CATEGORY:
- ☐ 1. Damaged or Significantly Damaged TSI ACM
- ☐ 2. Damaged Friable Surfacing ACM
- ☐ 3. Significantly Damaged Friable Surfacing ACM
- ☐ 4. Damaged or Significantly Damaged Misc. ACM
- ☐ 5. ACBM with Potential for Damage
- ☐ 6. ACBM with Potential for Significant Damage
- ☐ 7. Any remaining Friable ACBM or Friable suspect ACBM

19. HAZARD POTENTIAL CLASSIFICATION:
- ☐ 1. ACBM in good condition w/low potential for disturbance
- ☐ 2. ACBM in good condition w/potential for damage
- ☐ 3. ACBM in good condition w/potential for significant damage
- ☐ 4. ACBM in Damaged condition w/low potential for disturbance
- ☐ 5. ACBM in Damaged condition w/potential for damage
- ☐ 6. ACBM in Damaged condition w/potential for significant damage
- ☐ 7. ACBM in a Significantly Damaged condition

20. RECOMMENDED RESPONSE ACTION:
- ☐ 1. Response Action #1
- ☐ 2. Response Action #2
- ☐ 3. Response Action #3
- ☐ 4. Response Action #4
- ☐ 5. Response Action #5
- ☐ 6. Response Action #6
- ☐ 7. Response Action #7
- ☐ 8. Response Action #8

21. DAMAGED INVENTORY PRIORITY
☐ 1 ☐ 2A ☐ 2B ☐ 3

22. PLANNED ACTIVITY:
- ☐ New Activity/Use
- ☐ System Maintenance
- ☐ Required Repair
- ☐ Renovation
- ☐ Demolition

23. OTHER SYSTEMS IMPACTED:
- ☐ System Shutdown
- ☐ Backup System in Use
- ☐ No Backup/Alternate
- ☐ Routine System Maintenance

24. POTENTIAL WASTE:
- ☐ Non friable
- ☐ Regulated ACM
- ☐ Radiological Contaminated
- ☐ RCRA Contaminated

25. SAMPLING:
- ☐ ≥ 3, Non ACM, < 1000 ft.²
- ☐ ≥ 5, Non ACM, < 5,000 ft.²
- ☐ ≥ 7, Non ACM, > 5,000 ft.²
- ☐ ≥ 9, Non ACM
- ☐ 0, Assumed ACM

25.1

Sample #	%	Asbestos Type

25.2 LAB REPORT _____

26. WORK PACKAGE NUMBERS
_____

27. COMMENTS: _____
_____
_____
_____
_____

INSPECTION CHECKLIST
Appendix 1

1. Inspector W.D. Lockood Signature [signature] Accreditation [redacted]
   Date _____

2. BUILDING NO.: _____
   BLDG. AREA CODE: _____
   - ☐ 1. 1st Floor
   - ☐ 2. 2nd Floor
   - ☐ 3. 3rd Floor
   - ☐ 4. 4th Floor
   - ☐ 5. Basement
   - ☐ 6. Crawl Space
   - ☐ 7. Roof
   - ☐ 8. Exterior of Bldg.
   - ☐ 9. Plenum
   - ☐ 10. Other

3. ROOM NUMBER: _____
   COLUMN NUMBERS _____

4. SPECIFIC LOCATION _____

5. % FUNCTIONAL SPACE _____

6. FUNCTIONAL SPACE I.D. _____
   HOMOGENEOUS AREA I.D. _____

7. MATERIAL TYPE CATEGORY:
   - ☐ T. Thermal System Insulation
   - ☐ S. Surfacing Material
   - ☐ M. Miscellaneous Material

8.1 TSI ACM:
PIPE LENGTH (FT) _____

8.2 TSI ACM:
PIPE DIAMETER (IN.) _____

8.3 TSI ACM:
PIPE WITH INSULATION DIAMETER (IN.)
_____

8.4 SURFACING MISC. ACM:

8.5 TOTAL SURFACE MATERIAL (SQ. FT.)
_____

8.6 SURFACING/MISC ACM:
DEPTH OF SURFACE MATERIAL (IN.)
_____

9.1 FUNCTION CODE:
- ☐ 1. Acoustic Insulation
- ☐ 2. Baseboard
- ☐ 3. Boiler/Furnace Insulation
- ☐ 4. Caulking Matl
- ☐ 5. Ceiling Tile
- ☐ 6. Chilled Water Pipe
- ☐ 7. Chilled Water Pipe Fitting
- ☐ 8. Cold Water Pipe
- ☐ 9. Cold Water Pipe Fitting
- ☐ 10. Condensate Pipe
- ☐ 11. Condensate Pipe Fitting
- ☐ 12. Cooling Tower Baffles
- ☐ 13. Debris/Settled Dust
- ☐ 14. Domestic Cold Water Pipe
- ☐ 15. Domestic Cold Water Fitting
- ☐ 16. Door
- ☐ 17. Drain Pipe
- ☐ 18. Duct Insulation
- ☐ 19. Exterior Construction
- ☐ 20. Floor Tile
- ☐ 21. Fire Stop
- ☐ 22. Fireproofing Insulation
- ☐ 23. High Temp Water Pipe
- ☐ 24. High Temp Water Pipe Fitting
- ☐ 25. Mastic Adhesive
- ☐ 26. Roofing
- ☐ 27. Steam Pipe
- ☐ 28. Steam Pipe Fitting
- ☐ 29. Tank Insulation
- ☐ 30. Transite Board
- ☐ 31. Vibration Damper
- ☐ 32. Wall Board
- ☐ 33. Wall Insulation
- ☐ 34. Wall Plaster/Spackle
- ☐ 35. Other: _____

9.2 ASBESTOS FORM CODE:
- ☐ 1. Air cell
- ☐ 2. Blanket
- ☐ 3. Block
- ☐ 4. Cloth
- ☐ 5. Loose fill
- ☐ 6. Pre-formed
- ☐ 7. Sheet
- ☐ 8. Sprayed On
- ☐ 9. Troweled On
- ☐ 10. Other: _____

9.3 COLOR CODE:
- ☐ B Blue
- ☐ BL Black
- ☐ BR Brown
- ☐ G Green
- ☐ GR Gray
- ☐ O Orange
- ☐ W White
- ☐ Y Yellow
- ☐ OT Other: _____

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25.1

Sample #	%	Asbestos Type

25.2 LAB REPORT _____

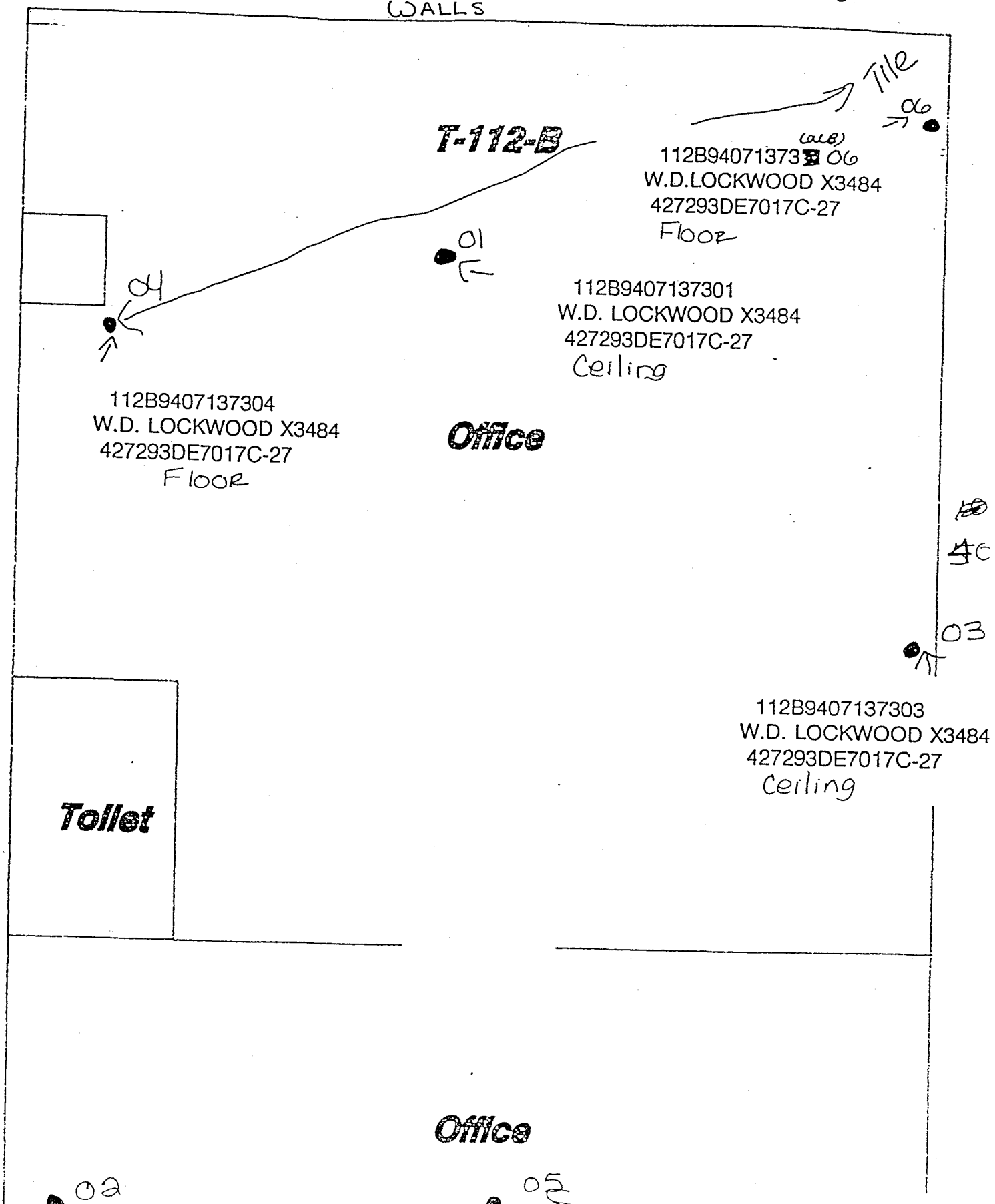
26. WORK PACKAGE NUMBERS
_____

27. COMMENTS: _____
_____
_____
_____
_____

40

Lt. Paneling

WALLS



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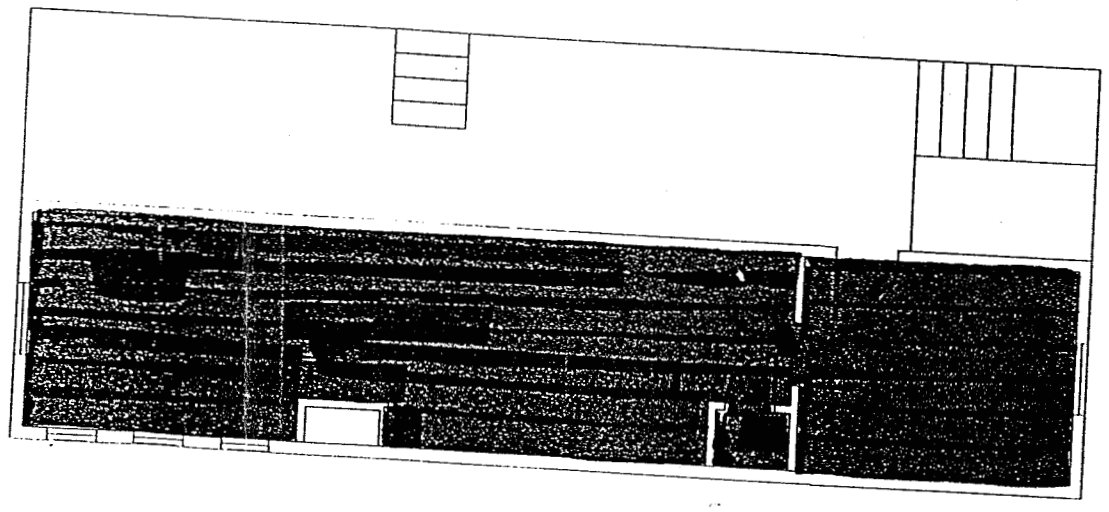
106



N

HOMOGENEOUS LEGEND

Ceiling

Floor

Wall

MOCK FLATS ENVIRONMENT
TECHNOLOGY SITE
T-112B